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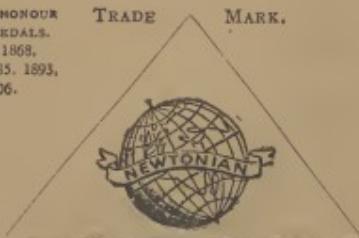
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For "Ten Minute Talks on Animals" by F. FINN, F.Z.S., see page 172.

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By Prof. F. FINN, F.Z.S.

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- 9 The head of Burdock.
- 10 Fruit of Barley Grass.
- 11 Fruit of Goat's Beard.
- 12 Fruit of "Old Man's Beard."
- 13 The fruit of Crane's-bill.
- 14 A glass-topped box containing fruits of Willow Herb.
- 15 Swallows collecting round a tower, near Redhill, before migrating.
- 16 Barn Swallows returning in pairs and landing on the Isle of Wight.
- 17 Apparatus for observing the sun.
- 18 Part of apparatus for observing the sun.
- 19 A Window showing the method of recording the height of the sun.
- 20 Diagram to show the position of the sun on the longest and shortest days.
- 21 Records of the position of a shadow on the floor.
- 22 Flower of a dwarf bean.
- 23 Flower of a dwarf bean from which the petals have been removed.
- 24 Young seed pod of a dwarf bean.
- 25 Shadow cast at noon by an erect rod.
- 26 Shadow cast at noon by a tilted rod.
- 27 A figure showing the connection between the angle made by style of a sun-dial, and that representing the latitude of place where it is used.
- 28 A figure showing one method of determining latitude.
- 29 A figure showing how to cut out the style for a paper model sun-dial.
- 30 A Sun-dial; seen from above.
- 31 A Sun-dial; seen from below.
- 32 Clouds. Cumulus indicative of approaching showers.
- 33 Clouds. Stratus pointing to fine weather.
- 34 A Sea Anemone expanded.
- 35 A Sea Anemone contracted.
- 36 A marine aquarium kept without changing the water for many years.
- 37 Back of an ordinary edible crab.
- 38 Underside of an ordinary edible crab (female).
- 39 The tail of a female edible crab extended to show the swimmerets.
- 40 Web of a garden spider.
- 41 House spider.
- 42 Garden spider.
- 43 A leaf scar on a sycamore twig.
- 44 Diagram showing the leaf arrangement of sycamore.
- 45 Spindle Tree leaf.
- 46 Dogwood leaf.
- 47 Wayfaring Tree leaf.
- 48 Lesser Maple leaf.
- 49 Greater Maple leaf.
- 50 Guelder Rose leaf.
- 51 Horse Chestnut leaf.
- 52 Elder leaf.
- 53 Ash leaf.
- 54 Lime leaf.
- 55 Common Elm leaf.
- 56 Wych Elm leaf.
- 57 Plane leaf.
- 58 Spanish Chestnut leaf.
- 59 Birch leaf.
- 60 Alder leaf.
- 61 Beech leaf.
- 62 Hazel leaf.
- 63 Hornbeam leaf.
- 64 Walnut leaf.
- 65 Blackthorn leaf.
- 66 Bird Cherry leaf.
- 67 Wild Cherry leaf.
- 68 Crab Apple leaf.
- 69 Aspen leaf.
- 70 Black Poplar leaf.
- 71 White Willow leaf.
- 72 Oak leaf.
- 73 Wild Service leaf.
- 74 White Bess leaf.
- 75 White Thorn leaf.
- 76 White Poplar leaf.
- 77 Mountain Ash leaf.
- 78 Holly leaf.
- 79 Scotch Pine leaf.
- 80 Larch leaf.
- 81 Yew leaf.
- 82 A common mould.
- 83 A portion of a mushroom bed.
- 84 A common cultivated mushroom.
- 85 A blind worm.
- 86 The hatching of a blind worm.
- 87 A viper. 2s. 6d.
- 88 A smooth snake (Coronella).
- 89 A viviparous lizard.
- 90 A hedgehog.
- 91 Head of a male wild cat.
- 92 Wild cat and her kittens.
- 93 A hybrid stoat ferret. Fourth generation.
- 94 A hybrid stoat ferret. This specimen was born with a stump tail.
- 95 A dormouse. (Douglas English.) 2s. 6d.
- 96 A squirrel.
- 97 Mr. A. Heneage Cock with one of his stoat-ferret hybrids.
- 98 The skeletons of man and horse compared.
- 99 A thoroughbred horse, "St. Simon."
- 100 A Shire horse, "Hiawatha."
- 101 Wild horses.
- 102 A hyacinth bulb cut through.
- 103 A hibernating humble-bee.
- 104 The edible snail and its winter lid.
- 105 Nest of a dormouse. 2s. 6d.
- 106 Oak log cut across.
- 107 Oak bark.
- 108 Bark of Spanish chestnut.
- 109 Section of Elder stem, showing the wide annual rings of wood and pith.
- 110 Section through a piece of Yew.

ETON NATURE STUDY—(Continued.)

- 78 Section through a piece of "stainy" Willow wood.
 79 Museum specimens and labels.
 80 A museum jar.
 81 Section of a railway cutting and limestone rocks near Ashbourne, Derbyshire.
 82 Sycamore twig.
 83 Valley showing the windings of the river which made it.
 84 Cross section of the stem of a cabbage.
 85 Section of a cabbage.
 86 Plane tree in winter.
 87 Methods of drawing trees.
 88 { Dwarf sugar bean. (Sutton's).
 Bean with the skin removed.
 89 Soaked bean beginning to shoot.
 Soaked bean with one lobe removed.
 90 Skeleton leaf of Magnolia.
 91 Skeleton of an Indiarubber-Plant leaf.
 92 Young bean seedling.
 93 Bean seedling bursting skin of the seed.
 94 { Bean seedling kept in a tube supplied with air.
 Bean seedling kept in closely corked tube.
 95 Development of the feathers of young Robin.
 96 Potato tuber.
 97 Developing "eye" of a Potato tuber.
 98 Young Lily bulbs growing from an old scale.
 99 Begonia leaf producing new plants.
 100 Young bryophyllum plants growing from a detached leaf.
 101 Frog eggs.
 102 Crocus.
 103 Trout egg.
 104 { Trout egg faintly "eyed."
 Trout egg fully "eyed."
 105 Newly hatched trout or "Allevin" showing the yolk sac.
 106 Young trout in the "fry" stage after the yolk sac has been absorbed.
 107 A Terrarium with accommodation for amphibious animals.
 108 Nest of the seven-spined Stickleback.
 109 Potato tuber showing "sprouts."
 110 { Frog's eggs, eight days old.
 Frog's eggs, twelve days old.
 111 A developing chick, two days old.
 112 A closed-in nesting box.
 113 Nesting box with the side open.
 114 A series of chickens of the same brood at different ages showing the replacement of the downy covering by feathers.
 115 { Tadpole just hatched.
 Tadpole—underside showing gills and mouth (three days hatching).
 116 A developing chick, three days old.
 117 Horse-chestnut buds.
 118 Potato showing young shoots.
 119 Horse-chestnut bud opening.
 120 Decaying vegetable matter pulled into the ground by a worm.
 121 An earthworm.
 122 { Tadpole, seven days old.
 Tadpole showing the hind limb.
 123 { Tadpole showing the hind and fore limb.
 Horse-chestnut bud opening and showing a bunch of young flowers.
 124 { A pill wood-louse rolled up.
 A pill wood-louse crawling.
 125 Centipede.
 126 Millipede.
 127 Lily bud.
 128 Silkworm eggs.
 129 "May."
 130 A dried Fritillaria plant.
 131 A dried branch of Alder.
 132 Lily bud swelling.
 133 Drone bee.
 134 An observatory hive.
 135 A nucleus hive.
 136 { Egg of the honey-bee.
 Larva of the honey-bee.
 137 Pupa of a drone in its cell.
 138 Humble-bee visiting Snapdragon.
 139 Lily bud about to open.
 140 A silkworm caterpillar.
 141 The blind wood-louse that lives in ants' nests.
 142 A gallery in ants' nest with their "cows".
 143 An ant's "cow," underside.
 144 Lily bud opening.
 145 Lily flower.
 146 Privet hawk caterpillar showing the bands which "break" the surface of its body.
 147 A lobster caterpillar.
 148 A hover-fly.
 149 Egg of the hover-fly, enlarged.
 150 Larva of the hover-fly preying on aphides.
 151 A white butterfly.
 152 The common snail.
 153 The underside of a snail.
 154 { The great grey slug.
 A worm-eating slug.
 155 { Egg of a worm-eating slug.
 Newly hatched worm-eating slug.
 156 { Egg of a worm-eating slug broken open to show the young one inside.
 Spine of Hawthorn.
 157 Spines of False Acacia.
 158 Prickles of Wild Rose.
 159 Gorse shoot.
 160 Leaf-like branch of "Butcher's Broom," bearing a flower bud.
 161 Fruit of "Butcher's Broom."
 162 Section across a side wound in Ash branch.
 163 Side wound on an Ash branch.
 164 Cross section of a recently made Apple graft.
 165 Cross section through an Apple graft after a year's growth.
 166 Maple tree in winter.
 167 Maple tree in summer.
 168 A Bryony tendril.
 169 A Sundew leaf.
 170 A Sundew leaf feeding.
 171 Section showing how a side branch of Walnut joins another.
 172 Marble gall showing the holes through which the insect inhabitants have escaped.
 173 Marble gall cut through, showing the cavities occupied by the grub.
 174 Marble gall showing the holes through which the insect inhabitants have escaped.
 175 Sheep's-wool galls on oak flowers.
 176 A "lodger" from a marble gall.
 177 A "Robin's Cushion" on a rose shoot.
 178 A fairy fly.
 179 Succession of moorland vegetation on Red bourne Edge, Weardale.
 180 Wild hyacinths.
 181 Spore-capsule covers of the Male Fern.
 182 Silkworm chrysalis.
 183 Silkworm cocoon from which the moth has emerged.
 184 Male silkworm moth.
 185 Female silkworm moth.
 186 Moss showing capsules.
 187 Liver-wort.
 188 A Fern Prothallus.
 189 Eggs of a twin-spot lady-bird on the under-side of a Hollyhock leaf.
 190 Larva of a lady-bird.
 191 Pupa of a lady-bird.
 192 Twin-spot lady-bird.
 193 Wild duck's nest covered.
 194 Wild duck's nest uncovered.
 195 Nearer view showing the eggs.
 196 Black-headed gull's nest and eggs.
 197 Black-headed gull's eggs hatching.
 198 Robin's nest.
 199 Young jackdaws.
 200 "The Eton Nature-Study Camera."

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3 " Nets	25 Mouse bones from Barn Owl casting	44 Larvae of Pussmouth <i>D. visula</i>
4 The Wildfowler Loading the Old Gun	27 Dormouse	49 Slide showing protected Butterflies and others of different genera imitating them
7 Common Gull in Net	28 Mouse in trap	49a "
10 The Gamekeeper	29 Axis deer. Leonardslee Park	52 Lapset Moth, just hatched, on empty cocoon
14 Pole Trap	30 Bennett's Wallabies, Leonard-slee Park	54 Trout Fishing
15 Weasel Trap	32 Prairie dogs	56 New coming to surface of water to breathe
16 Hare	33 Prairie dogs looking out of a hole, Leonardslee Park	
17 Rabbit looking out of hole	34 Viper basking	
18 Rabbit in the grass		
19 Rabbitting with Ferret		

RU**NATURAL HISTORY SUBJECTS.**

Most of these are from drawings by A. THORNBURN, G. E. LODGE, and others; copied by permission of "Illustrated London News," "Knowledge," &c.

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1 A hungry Raven	49 "Coveys fairly large and Birds well grown"	79 Tiger's Head. <i>Very fine.</i>
2 On the sea shore	50 The latest Hybrid Pheasants, descendants of English-Japanese parents	80 The Last of the Quaggas. ("Knowledge," Oct., 1902.)
3 Daybreak on the 12th	51 A Disregarded Warning: A Stoat killing a Rabbit under a Gamekeeper's Trophy of Vermin	81 The White-tailed Gnu.
4 A successful foray	52 An Unexpected Enemy. Fox about to spring on pheasant. Snow scene.	82 Head and forequarters of the Aye-Aye, the most remarkable of the Malagasy Lemuroids (Dec., 1901).
5 The haunts of the Bittern	53 Fight between Fox and Stoat in Snow.	83 Pair of Arabian Baboons.
6 Highland poachers	54 Peewits Alarmed by Partridges. A nest disturbed.	84 The Great Marion Tortoise (<i>Testudo sumeirei</i>) now living at Port Louis, Mauritius (March, 1903).
7 Plovers	55 Havoc. Stoat raiding a partridge's Nest.	85 Pair of Brazilian Tortoises.
8 Terns, a sheltered corner	56 Peregrine Falcon Teaching its Young to Stoop.	86 Tortoise with Eggs in Garden.
9 Bustards at sunrise	57 The Tree-Warbler.	87 Common Frog.
10 A drive	58 Wild Ducks Entering Decoy Pond at Daybreak.	88 Common Toad.
11 Grouse gliding up to the guns	59 Fox Hunting Hares.	89 The King Crab.
12 A Merlin seizing her prey	60 The first glimpse of the besters	90 Oriental River Prawn, <i>Palaemon lar</i> Fabricius. From Spence Bate (Oct., 1899).
13 Wildfowl on the mud flats	61 The Pacific Eider Duck at Home.	91 Arctic Shrimp. <i>Sclerocrangon ferox</i> Sars. From Sars (Oct., 1899).
14 Snipe horning	62 The Humming-Bird.	92 Forster's Lung-fish, <i>Ceratodus forsteri</i> (March, 1906).
15 On the outlying heath	63 Birds of Paradise, I.	93 Marked Plaice, which travelled 40 miles in 20 days, and was then recaptured (July, 1905).
16 The first drive of the season	64 " II.	94 The Teredo. A mollusc which eats into the Submarine Cable.
17 The home of the Ptarmigan	65 The Secretary Bird and Common Rock Snake of Natal.	FUR-BEARING ANIMALS.
18 Falcon on the watch	66 Swans, whistling and mate.	95 Silver Fox.
19 Woodcock dropping into cover	67 Scoresby's Gull (June, 1905).	96 The Ermine.
20 Spent (Fox)	68 The Honey-Buzzard Rising a Wasps' Nest of Larvae.	97 White Fox and Squirrel.
21 Condemned to death (Stags)	69 Bird Snarers at Work.	98 Mink and Sable.
22 Through the deep drift (Stags)	70 Soaring Wild Fowl.	99 The Opossum.
23 Mallards off the Coast	71 Extinct and Vanishing Birds.	100 The Beaver and the Canadian Otter.
24 Guillemots and Puffins	72 Wing of Bird (Green Canary).	101 Wild Duck on Nest.
25 Goldfinches [Coast	73 Grey Parrots and Nestlings.	102 Moorhen's Nest and Eggs.
26 Cormorants on the Wild West	74 White Raccoon Dog ("Knowledge," April, 1905).	103 Swan on Nest.
27 Christmas-Visitors (Field Fares)	75 Like and yet Unlike. An Asiatic (A) and an African (B) Flying Squirrel. ("Knowledge," March, 1902.)	104 Thrush's Nest and Eggs.
28 Norwegian Hawk Owl	76 The Glossy Ibis ("Knowledge," March, 1905).	105 Snipe on Nest.
29 Black Game [Plumage	77 A Lion in Jungle.	106 Hawk Owl with feathers displayed.
30 Ptarmigan in Summer	78 An Unbidden Guest. Lion in search of food.	107 Slugs on a Cabbage Leaf.
31 The Poacher (two birds)		
32 Condor of the Andes Eagle		
33 Peregrine Falcon and Ptarmi-		
34 The Moors, Blackcock [gan		
35 Partridges in Winter Months		
36 Hen and Cock Pheasant on Nest		
37 Hare and Pheasants at Rest		
38 Wild Duck Shooting		
39 Grouse-shooting: Flanking the Pack into the Guns		
40 Pheasants in Close Time		
41 Grey Hen and Nest [Plumage		
42 Partridges in Mid-September		
43 Sparrow Hawk raiding a flock		
44 Black Game [of Chaffinches		
45 Mallard going down wind		
46 Parent Partridges and the last of their Brood; the Cock and Hen distinguished by Plumage		
47 Greenland Falcon, Adult Plum-		
48 Three Herons in Flight		

Z T**WILD LIFE, ETC.**

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- 1 Bempton Cliff-climbers, Group of Climbers, with Tackle.
 2 " Climber going backward over Cliff.
 3 " View of Cliff, 300ft high, with Climbers at Work.
 4 " The Pullers at Work on Cliff-top.
 5 " Climber walking up the Face of Cliff.
 6 " Climber nearing the Cliff-top.
 7 " Climber at the Top.
 8 " Climber emptying his Pouches.
 9 " A Heap of 300 Eggs of Guillemots and Razorbills.
 10 " Birds on the Cliff Ledges.
 11 Carrion Crow.
 12 Cuckoo (young) on Nest of Pied Wagtail.
 13 Curlews, Two Young.
 14 Turtle Doves, Pair of Young.
 15 Spotted Flycatcher beside Nest.
 16 " Young Bird.
 17 Young Red Grouse among Heather.
 18 Black-headed Gulls. A pretty View of Island with Birds on Nest and on the Wing.
 19 " General View of Gullery.
 20 " Young just Hatched, showing another pecking its Way out of Egg.
 21 " On Nest.
 22 " Standing beside Nest.
 23 Merlin Hawk on Nest.
 24 Nightjar (young), 10 days' old.
 25 " 3 weeks' old.
 26 A White Jackdaw.
 27 A Young Jay.
 28 Jays (young) on Edge of Nest.
 29 " Showing Crest.
 30 Kingfisher at Home.
 31 Knots, A Group of.
 32 Lapwing.
 33 " Nest and Eggs, with young one just Hatched.
 34 " Nest of Young.
 35 A Pair of Young Magpies.
 36 Mallard (Wild Duck) on Nest.
 37 " Nest Covered, as left by Bird.
 38 " Nest Uncovered, showing Eggs.
 39 King Ousey on Nest.
 40 Barn Owl, Nesting Tree.
 41 " Interior View, showing Eggs and Mice.
 42 A Young Long-eared Owl.
 43 " Two in Nest.
 44 " On Twigs.
 45 Tawny Owl on Nest in Rabbit Burrow.
 46 Partridge on Nest.
 47 Pheasant on Nest.
- 48 Tree Pipit on Nest.
 49 " Beside Nest.
 50 Robin on Greenhouse.
 51 Sandpiper, Haunt of.
 52 " On Nest.
 53 " Nest and Eggs.
 54 Skylark on Nest.
 55 " Feeding Young.
 56 " Young, on Nest.
 57 Snipe on Nest.
 58 " Two Young.
 59 Starling about to feed Young.
 60 Missel Thrush feeding Young.
 61 Song Thrush at Home.
 62 Great Tit with Food for Young.
 63 A White Turkey.
 64 Grey Wagtail on Nest.
 65 Sedge Warbler feeding Young.
 66 Willow Warbler entering Nest.
 67 Wheatear near its Nest.
 68 Whitethroat feeding Young.
 69 Woodcock on Nest.
 70 Green Woodpecker, Nesting Site, showing Hole in Tree.
 71 " Pair of Young.
 72 " Family of Young.
 73 Wren feeding Young.
 74 A Bahoon in a Fit of Temper.
 75 The Badger.
 76 A West Highlander (Bull).
 77 Dogs, Foxhounds at the Kennels.
 78 " Out for Exercise.
 79 " A Meet of the Hounds.
 80 " Young Lupetti Dogs.
 81 A Retriever (head study).
 82 A Young Wild Fox leaving Fox-earth.
 83 Horse (a head study).
 84 Field Mouse Nest with Young.
 85 Otters, A Pair of Young.
 86 " Leaving Pond after a Bath.
 87 Pigs, A Study in Black and White.
 88 Rabbit (young) at the Entrance of Burrow.
- 89 Wildflowers *in situ*, Daisies in Field.
 90 " Forget-me-nots in Whins.
 91 " Primrose Root in Wood.
 92 " Wood Anemone.
 93 " Water Ranunculus.
 94 The Dipper at Home.
 95 Young Sandpiper on Nest, just hatched.
 96 A Pair of Young Barn Owls. An amusing study.
 97 Four young Leverets in the Form.
 98 Woodcock on Nest.
 99 Woodcock on Nest (nearer view).
 100 Woodcock on Nest. The bird only.

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 12 Orange Underwing.
- 13 Pupa of Indian Mantis.
 14 Wild Rabbit.
 15 Hare and Pheasants at rest.
 16 The latest hydrid Pheasants.
 17 Hen and Cock Pheasant on nest.
 18 The home of the Ptarmigan.
 19 Ptarmigan in summer plumage.
 20 Ptarmigan in winter and autumn plumage.
 21 Variable toad, side view.
 22 Ichneumon Fly.
 23 Hare in fern.
 24 Black and White Moths.
- 25 Larva of Purple Emperor.
 26 Larva of Purple Emperor.
 27 Hornet Clearwing, Front view.
 28 Mimicking Spider. Bramble Blossom.
 29 Buff Tip.
 30 Brimstone on Holly.
 31 Stoat, front view, crouching.
 32 Caddis worm with casing of starwort leaves.
 33 Chamomile.
 34 Lemon Sole in natural surroundings.
 35 Stick Caterpillars.

Application should be made for additional Slides on this subject as new photographs are constantly being obtained.

T H**NATURAL HISTORY SUBJECTS.**

Photographed from life by DOUGLAS ENGLISH.

A large number of these slides are from unique photographs which have been used in the illustration of standard works on natural history, e.g., Millais' "British Mammals" and Brehm's "Tierleben," all over the world.

A selection of them was awarded the technical Medal of the Royal Photographic Society in 1901, and a further selection is permanently exhibited in the British Museum (Natural History), South Kensington; while in 1924, they gained the remarkable distinction of jointly heading the award list in the competition for the Emerson Medal, an international competition for photographs of any date and any subject, judged solely on their artistic merit by a committee of painters. For use in connection with them the following books are recommended to lecturers: "Wee Tim'rous Beastes," "Beastes Courageous," "A Book of Nimble Beastes" (Bell), "Our Farmyard Friends" (Bell), "Friends of Mankind," a study of Domestic Animals (Duttons, New York); all by Captain English and all, with the exception of the last, illustrated by his photograph; also his "Songs of Field and Farm," poems contributed originally to *Punch*, and his articles contributed to "Wild Life" during his editorship of that Magazine, and to Cassell's "Nature Book."

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MAMMALIA.**ORDER CHIROPTERA (BATS).**

- 1 Long-eared Bat (*Plecotus auritus*), dorsal view.
- 2 " side view.
- 3 " front view.
- 7 Serotine Bat (*Vesperugo serotinus*) front view.
- 8 " side view.
- 13 Noctule Bat (*Vesperugo noctula*) front view.
- 14 " three-quarter view.
- 15 " descending trunk.
- 16 " pair of.
- 19 Common Bat (*Vesperugo pipistrellus*), front view.
- 20 " showing teeth.
- 21 Common Bat, dorsal.
- 22 Natterer's Bat, front.
- 23 Natterer's Bat, side.
- 24 Natterer's Bat, drawing.
- 25 Greater Horseshoe Bat, front.
- 26 Greater Horseshoe Bat, side.
- 27 Greater Horseshoe Bat, suspended.
- 28 Lesser Horseshoe Bat, front.
- 29 Lesser Horseshoe Bat, side.
- 30 Lesser Horseshoe Bat, suspended.

ORDER INSECTIVORA.

- 31 Hedgehog (*Erinaceus Europaeus*), side view.
- 32 " front view.
- 33 " dorsal view.
- 34 " coiled.
- 35 " attacking grass-snake.
- 36-41 Six Successive Stages of a Hedgehog uncurling.
- 42 Two Young Hedgehogs in Nest.
- 43 An Old Hedgehog climbing.
- 44 Magnified section of pointed end of Hedgehog's Quill.
- 45 " root end.
- 46 " transverse section of Quill.
- 47 " superficial view of Quill.
- 52 Mole (*Talpa Europaea*), side view.
- 53 " with eyes clearly displayed.
- 54 " devouring worm.
- 55 " burrowing.
- 56 " emerging.
- 60 Bones of the Mole's Fore-limb.
- 61 " with Bones of Shrew-mouse for comparison.
- 62 Magnified vertical section through Mole's Mandible.
- 63 " superficial view of Mole's Mandible.
- 64 " grinding surface of worn Lower Molars.
- 65 ventral aspect of Upper Jaw.
- 66 Vertical section of simple Mole Fortress.
- 67 " complicated Mole Fortress, four nests in situ.

69 Mole's Zig-zag Surface Run.

- 76 Common Shrew Mouse (*Sorex araneus*), side view.
- 77 " running.
- 78 " sitting up.
- 79 Duel between Common Shrew Mice, feinting for opening.
- 80 " one combatant caught by tail.
- 81 " close-locked spin.
- 82 " breaking away.
- 83 Pygmy Shrew Mouse (*Sorex minutus*) front view.
- 84 " dorsal view.
- 85 " climbing.
- 86 " hunting insect.
- 87 " eating beetle.
- 88 " asleep.
- 89 Water Shrew Mouse (*Crossopus fodiens*), foraging at edge of water.
- 90 " about to dive.
- 94 Shrew Mouse Skin, with Hair parted to show Scent-glands.
- 95 Front view of Head of dead Shrew Mouse, showing vibrissæ.
- 96 Hibernating Glands of Shrew Mouse.
- 97 Magnified Skull of Common Shrew Mouse.
- 98 " Mandible of "
- 99 " Upper Jaws of "
- 100 Magnified vertical section through Mandible of Water Shrew Mouse.
- 101 Skulls and Fore-umbones of the Pygmy Shrew Mouse, an immature Common Shrew Mouse of the same size, and a mature Common Shrew Mouse.
- 102 Dead specimens of the Pygmy Shrew Mouse and an immature Common Shrew Mouse, showing the external specific differences.

ORDER CARNIVORA.

- 105 Badger (*Meles taxus*), side view.
- 106 " emerging from burrow.
- 107 " pair of.
- 108 Badger's Skull, side view.
- 109 " dorsal view.
- 110 Marten (*Mustela martes*), side view.
- 111 " standing.
- 112 " sliding on bough.
- 113 " with extended neck.
- 114 "
- 118 Polecat (*Putorius fortidus*), front view.
- 119 " with extended neck.
- 120 " asleep.
- 124 Stoat (*Putorius erminea*), front view, sitting up.
- 125 " front view, crouching.
- 126 " side view.
- 127 " coiled

NATURAL HISTORY SUBJECTS—Continued.

- 131 Weasel (*Putorius vulgaris*) side view.
 132 " listening.
 133 " with extended neck.
 134 " coiled.
 135 Weasel Kittens.
 136 Skulls of Stoat and Weasel, showing dentition and articulation of Jaws.
 137 Fox Cub, front.
 138 " side.
 139 Fox, " front.
 140 " side.
 141 " crouched.
 142 Badger, front.
 143 " side.
 144 Articulation of Badger's jaw.
 145 Badger's Earth.
 146 Otter, side.
 147 " front.
 148 Otters playing in water.
 149 Otter swimming.
 150 Wild Cat, front.
 151 " " side.
 152 " " startled.

ORDER RODENTIA.

- 170 Squirrel (*Sciurus vulgaris*), side view.
 171 " front.
 172 " standing.
 173 " sitting up.
 174 " listening.
 177 Dormouse (*Muscardinus avellanarius*) front view.
 178 " side view.
 179 " three-quarter view.
 180 " asleep.
 181 Nest of Dormouse in furze Bush.
 182 Nuts gnawed by Dormouse.
 186 Harvest Mouse (*Mus minutus*), feeding.
 187 " side view.
 188 " front view.
 189 " climbing.
 190 Pair of Harvest Mice.
 191 " showing use of Prehensile Tail.
 192 Harvest Mouse's Nest.
 196 Long-tailed Field Mouse (*Mus sylvaticus*), front view.
 197 " side view.
 198 " three-quarter view.
 199 " under dandelion.
 200 " crouching, with depressed ears.
 201 " listening.
 203 Magnified right Upper and Lower Molars of same.
 206 Common Mouse (*Mus musculus*), front view.
 207 " side view.
 208 " standing.
 209 " on trap.
 210 " entering trap.
 211 " in trap.
 212 Duel between House Mice.
 213 Cinnamon Variety of Common Mouse (Partial albino).
 217 Red-backed Meadow Mouse (*Eotomys glareolus*), front view.

AMPHIBIA and REPTILIA.

ORDER AMPHIBIA.

- 320 Grass Frog (*Rana temporaria*), side view.
 321 " front view.
 322 Spawn of Grass Frog, early stage.
 323 " eggs commencing to hatch.
 324 Magnified Spawns, tadpoles showing branchiae.
 325 Dorsal and lateral views of Tadpoles showing branchiae.
 326 Tadpoles feeding on Star-wort.
 327 Various stages of Tadpoles, showing development of Limbs.
 328 " "
 329 Edible Frog (*Rana esculenta*), side view.
 330 " gaping.
 334 " croaking, vocal sacs distended.
 336 " climbing.

- 218 Red-backed Meadow Mouse (*Eotomys glareolus*), side view.
 219 " three-quarter view.
 220 " burrowing.
 221 " cleaning tail.
 222 Skulls of Red-backed Meadow Mouse, Common Meadow Mouse, and Long-tailed Field Mouse, showing specific differences.
 224 Nest Material of Red-backed Meadow Mouse.
 225 Magnified right Upper and Lower Molars of same.
 229 Common Meadow Mouse (*Microtus agrestis*), front view.
 230 " side view.
 o mmon Meadow Mouse
 232 Magnified right Upper and Lower Molars of same.
 233 Albino Variety of same, front view.
 234 " side view.
 235 " feeding.
 236 Orkney Meadow Mouse (*Microtus orcadensis*), front view.
 237 " side view.
 238 " sitting up.
 239 Duel between pair of same.
 240 Typical Surface-run of Meadow Mouse, laid on-n.
 241 Opened Entrance of same.
 250 Water Rat (*Microtus amphibius*), front view.
 251 " side view.
 252 " entering water.
 253 " swimming river.
 254 " feeding on reed.
 255 Duel between Water Rats.
 256 Skull of Water Rat.
 257 Magnified Lower Molars of same.
 263 Common Brown Rat (*Mus decumanus*), front view.
 263 " side view.
 264 " three-quarter view.
 265 " feeding.
 266 " running.
 267 " emerging from hole.
 271 Alexandrine Brown Rat (*Mus alexandrinus*), front view.
 272 " side view.
 276 Old English Black Rat (*Mus rattus*), standing.
 277 " listening.
 278 " collecting nest-material.
 282 Alexandrine Black Rat (*Mus rattus ater*), side view.
 283 " sitting up.
 284 " feeding.
 285 Hare (*Lepus timidus*), in form.
 287 Leveret (*Lepus timidus*), front view.
 288 " side view.
 289 Hare, " front view.
 290 " side view.
 291 " three-quarters.
 293 Upper Jaw of Leveret.
 295 Wild Rabbit.
 296 Rabbit appearing over Ridge.

- 340 Common Toad (*Bufo vulgaris*), side view.
 341 " front view.
 342 " floating in water.
 343 Group of Three Common Toads.
 344 Shoulder-girdles of Grass Frog and Common Toad.
 347 Natterjack Toad (*Bufo calamita*), front view.
 348 " side view.
 349 " stretching himself.
 350 Natterjack and Common Toad together.
 354 Variable Toad (*Bufo viridis*), side view.
 355 " front view.
 358 Tree Frog (*Hyla arborea*), climbing.
 362 Fire-bellied Toad (*Bombinator igneus*), side view.
 363 " in defensive attitude.
 364 Pair of same, one in defensive attitude.

NATURAL HISTORY SUBJECTS—Continued.

ORDER REPTILIA.

- 365 Pair of Fire-bellied Toads (*Bombinator igneus*). One feigning death.
 370 Salamander (*Salamandra maculosa*), front view.
 371 " side view.
 373 " dorsal view.
 373 Pair of same, side view.
 374 " dorsal view.
 400 Smooth Newt (*Triton vulgaris*), male.
 401 " female.
 403 Group of Male and Female Smooth Newts.
 403 Male Smooth Newt, showing reproduction of tail.
 404 Courtship of two Smooth Newts.
 405-410 Six stages in the development of Newt Tadpoles from the egg.
 411 Tadpoles of Smooth Newt and Great Warty Newt, front view.
 412 " side view.
 413 Smooth Newt's discarded Skin suspended in water.
 418 Great Warty Newt (*Triton cristatus*), male.
 417 " female.
 418 " male and female.
 421 Palmated Newt (*Triton palmatus*), male.
 422 " female.
 425 Pair of Alpine Newts (*Triton alpestris*).
 429 Slow-worm (*Anguis fragilis*), full stretch.
 451 " coiled.
 459 Two young Slow-worms.

- 465 Common Lizard (*Lacerta vivipara*), male.
 466 " female.
 469 Sand Lizard (*Lacerta agilis*), male.
 470 " female.
 474 Green Lizard (*Lacerta viridis*), male.
 476 Wall Lizard (*Lacerta muralis*), side.
 477 " showing fight.
 490 Chameleon (*Chamaeleon vulgaris*), front view.
 491 " side view.
 496 Grass Snake (*Tropidonotus natrix*), full length.
 496 Grass Snake, head reared.
 497 " coiled.
 498 Eggs of Grass Snake.
 503 Smooth Snake (*Coronella austriaca*), full length.
 503 " coiled.
 504 " sloughing, eye-scale opaque.
 505 " dorsal view.
 509 Adder (*Pelias berus*), striking.
 510 " front view of head.
 511 " coiled.
 512 Adder raising head.
 513 Small Red Adder striking.
 514 " dorsal view of head.
 516 Dissection of Adder's Head, showing poison glands.
 517 Adder's Skull, fangs depressed.
 518 " fangs erected.
 519 Adder's Fang, side view.
 520 " front view.

PISCES (FISH).

- 540 Young Perch (*Perca fluviatilis*).
 541 Bullhead (*Cottus gobio*).
 542 Eel (*Anguilla vulgaris*), leaving water.
 543 Gudgeon (*Gobio fluviatilis*).
 545 Lancet (*Nemacheilus barbatulus*).
 547 Sticklebacks (*Gasterosteus aculeatus*).

- 548 Stickleback and Nest.
 549 Paradise Fish (*Polyacanthus viridi-auratus*).
 560 Lamprey (*Petromyzon fluviatilis*).
 561 " ventral surface.

For set of "Fish Life," see page 181.

INSECTA (INSECTS).

ORDER LEPIDOPTERA.

- a, signifies wings spread; b, wings half-spread;
 c, wings closed; m, protective or aggressive mimicry.
 570 Swallow-tail (*Papilio Macbaon*). a
 571 " " b
 572 " " c
 575 Large White (*P. Grassicea*). e
 577 Green Veined White (*P. Napi*). b
 578 " " c
 580 Orange Tip (*E. cardamines*). a
 581 " " b
 582 " " c
 583 " " m
 584 Pale Clouded Yellow (*C. Hyale*). c
 588 Brimstone (*G. Rhamni*). e
 589 " on bolly. m
 592 Small Pearl-bordered Fritillary (*A. selene*). a
 593 " c
 594 Silver Washed Fritillary (*A. paphia*). a
 595 " " b
 596 " " c
 597 " " m
 606 Comma (*V. e-album*). a
 607 " c
 609 Large Tortoiseshell (*V. polychloros*). a
 610 " " b
 611 " " c
 613 Small Tortoiseshell (*V. urticae*). a
 616 Peacock (*V. io*). a
 617 " c
 619 Camberwell Beauty (*V. antiopa*). a
 620 " c
 623 Red Admiral (*V. atalanta*). a
 624 " b
 626 Painted Lady (*V. cardui*). a
 627 " c
 629 White Admiral (*L. sibylla*). a
 630 " e
 631 Chrysalis of same. "

- 633 Purple Emperor (*A. iris*). a
 634 " " b
 635 " " c
 636 Egg of same.
 637 Larva of same. m
 638 Pupa of same. m
 639 Pair of Purple Emperors. a, e
 642 Marbled White (*M. Galatea*). a
 650 Grayling (*S. semele*). c
 653 Ringlet (*E. byneranus*). c
 658 White-letter Hair Streak (*T. w-album*). c
 659 Pair of same. m
 663 Green Hair Streak (*T. rubi*). e
 669 Common Blue (*L. icarus*). a
 670 " " e
 673 Chalk Hill Blue (*L. eorydon*). a
 674 Holly Blue (*L. argiolus*). c
 678 Duke of Burgundy (*N. lucina*). a
 679 " " c
 681 Grizzled Skipper (*S. malvae*). a
 683 " " c
 684 Small Skipper (*H. thausas*). a
 690 Death's Head Hawk Larva (*S. atropos*).
 691 " m
 693 Privet Hawk Larva (*S. ligustris*). m
 696 Large Elephant Hawk Larva (*S. elephas*), early stage.
 697 " full fed.
 698 " full fed. m
 703 Humming Bird Hawk Moth (*M. stellatarum*).
 703 Broad Bordered Bee Hawk.
 704 Pair of same.
 705 Hornet Clearwing (*T. apiformis*), dorsal view. m
 706 " side view. m
 707 " front view. m
 708 " three-quarter view. m
 709 Hornet Clearwing. *Bembecia*. Front. m.
 710 " " " Side. m.
 711 " " " " m.

NATURAL HISTORY SUBJECTS—Continued.

- 712 Clearwing, Culiciformis. Dorsal. m.
 713 " " Side. m.
 714 " " Front. m.
 715 Larva of Cinnabar Moth (E. Jacobae). m
 718 Cream Spot Tiger (A. villica).
 720 White Ermine (S. Menesthastris), dorsal view.
 721 " front view.
 723 Larva of Gold-tail Moth (Auriflua), dorsal view.
 724 " side view.
 727 Lappet Moth (L. queriefolia).
 740 Larva of Emperor Moth (S. pavonia).
 741 Cocoon of same.
 742 Female Emperor Moth.
 747 Scalloped Hook-tip, dorsal view.
 748 " front view.
 749 " side view.
 750 Larva of Puss Moth (D. vireula). m
 751 " whips extended. m
 753 Cocoon of same. m
 753 Puss Moth, front.
 754 " side.
 756 Buff Tip (P. bucephala), dorsal view. m
 757 " side view. m
 770 Mother Shipton (H. mi), dorsal view.
 774 Swallow Tail Moth (U. sambucaria), dorsal view.
 775 " side view.
 776 Large Emerald (G. papilionaria), dorsal view.
 777 " side view.
 778 Pepper Moth. (Melanism). b.
 779 " Side.
 780 Common Ware (C. exanthemaria).
 781 " impaled on thorn by wind.
 784 Curvant Moth (A. grossulariata).
 787 Beautiful Carpet (N. albicillata).
 788 Treble Bar Moth (A. plagiata).
 790 White Plume Moth (A. pentadactyla), dorsal view.
 791 " side view.
 792 Pair of Plume Moths.
 793 Vapourer Moths, male and female.
 794 Psyche in case. m.
 795 Long-horn Moth (Adela).
 796 Larva of Lobster Moth (S. fagi). m
 799 " feeding.
 800 Pair of same.
 802 Larva of Purple Thorn (Trimaculata). m
 804 Pupa of Brimstone and Peacock Butterflies.
 805 Pupa of Swallow-tail, Silver-washed Fritillary and large Tortoiseshell Butterflies.
 806 Small Black and White Moth, mimicry of excrement.

ORTHOPTERA.

- 810 British Cockroach. (E. lapponica). Side.
 811 " " Dorsal.
 815 Common Cockroach (B. orientalis), side view.
 816 " on mouse-trap.
 817 Common Grasshopper (Stenobothrus).
 818 Pair of same.
 823 Tettix bipunctatus.
 826 Green Sabre-tailed Grasshopper (L. punctatissima), female.
 829 Tree Grasshopper (M. varium), female.
 831 L. punctatissima and M. varium together.
 834-7 Four stages of the Brown Sabre-tailed Grasshopper (T. cimerus).
 838 Pair of Male T. cimerus.
 840 Great Green Grasshopper (L. viridissima), female.
 841 " dorsal view. *
 843 " legs raised.
 843 Platycleis grisea. Male and female.
 844 " Three-quarter.
 850 Field Cricket (Gryllus campestris), side view.
 851 " front view.
 852 " backing out of hole.
 853 " stridulating at entrance of hole.
 854 Pair of same.
 855 Immature Female of same (no ovipositor).

- 856 Stridulating organ. Field Cricket.
 860 Mole Cricket (Gryllotalpa gryllotalpa), side view.
 861 " three-quarter view.
 863 House Cricket (Gryllus domesticus), side view.
 866 " dorsal view.
 867 Larval House Cricket.
 868 Wood Cricket (N. sylvestris). Side.
 869 " " " Dorsal.

HYMENOPTERA.

- 880 Giant Wood-wasp (S. gigas) dorsal view.
 881 " side view.
 882 " ventral view.
 885 Larva of Sawfly.
 887 Ichneumon Fly (Proteus).
 888 Ichneumon Fly (Ophion).
 892 Common Wasp (Vespa vulgaris), side view.
 893 " front view.
 894 Queen of same hibernating.
 895 Entrance of Wasp Nest.
 896 Crabro interruptus.
 897 Store of same, Bluebottles.
 898 Sand-wasp (O. spinipes), see also Life History of Mud Wasp.
 899 Sand-wasp (Ammophilus sabulosus).
 901 Sand-wasp (Boops), front view.
 902 " side view.
 903 " dorsal view.
 904 Sand-wasp (Flavipes), side view.
 905 " dorsal view.
 907 Rubytail (Chrysis ignita).
 912 Dipterous Fly devouring small Sand-wasp.
 914 Cuckoo of the Leaf-cutter Bee (Coccygys).
 916 Burrowing Bee (Anthophora pilipes), dorsal view.
 917 " side view.
 918 Cuckoo of same (Melecta armata), dorsal view.
 921 Long-Horned Bee. Dorsal.
 922 " Side.
 923 Sawfly. Side.
 924 Larvae of Sawfly.
 925 Sawfly. T. mesomela.
 926 Humble Bee (Bombus terrestris), on daffodil.
 928 " on hyacinth.
 926 Solitary Wasp (Crabro cibarius).

NEUROPTERA, DIPTERA, AND THYSANOPTERA.

- 940 Dragon Fly (L. depressum).
 941 " Larvae (L. depressum).
 942 " (Cordulegaster).
 944 " (Calopteryx).
 946 " (Agrion).
 948 Lacewing Fly (Chrysopis), dorsal view.
 949 " side view.
 950 Stalked Eggs of same.
 952 Crane Fly (Tipula), on bramble.
 953 Bee Fly (Bombylius), on thyme. m
 954 " on scabious. m
 956 Wasp Fly (Volucella).
 957 Hover Fly (Syrphus).
 959 Caddis Worm, with casing of starwort leaves. m
 960 Caddis Fly (Phryganea grandis).
 961 Drone Fly (Eristalis), on Golden Rod.
 962 Scorpion Fly. Male.
 963 " Female.
 965 Robber Fly. Asilus.
 966 Gnat. Culex. Magnified.
 967 Daddy Long Legs.
 968 Bombylius major.
 969 Bombylius minor.
 970 Mayfly.

COLEOPTERA.

- 980 Tiger Beetle (Cicindela), dorsal view.
 981 " side view.
 986 Great Water Beetle (H. piceus), male.
 987 " female.
 988 " female and larva.

NATURAL HISTORY SUBJECTS—Continued.

- 991 Devil's Coach-horse (*O. olens*), dorsal view.
 992 " side view.
 998 Burying Beetle (*Humator*).
 999 Burying Beetle (*Vespollo*), on dead mouse.
 1001 Cockchafer (*Melolontha*), dorsal view.
 1002 " taking flight.
 1004 Musk " Beetle (*Aromia moschata*), dorsal view.
 1007 Male Stag Beetle (*L. cervus*), dorsal view.
 1008 " front view.
 1009 Female Stag Beetle, with Larva in situ.
 1010 " burying herself.
 1011 Death Watch Beetle (*Anobium*).
 1013 Rose Beetle (*Cetonia aurata*).
 1014 Wasp Beetle (*Clytus arietis*), dorsal view. m
 1015 " " "
 1016 " from view. m
 1017 Bloody-nosed Beetle (*Timarcha*).
 1019 Dog Beetle (*Geotrupes*).
 1021 Wire Worm (*Elatier*), dorsal view.
 1022 " side view.
 1024 Soldier Beetle (*Telephorus*).
 1026 Long-horn Beetle (*Strangalia*), dorsal view.
 1027 " side view.
 1028 " Hylotrupes.
 1029 Broad-thighed Beetle (*Oedemera*).
 1030 Tortoise Beetle. *Cassida*.
 1031 Pill Beetle. *Byrrhus*.
 1032 Weswil. *R. betuleti*.
 1033 Weswil. *A. coryli*.
 1034 Churchyard Beetle. *Blaps*.
 1035 Male and Female Glow-worms.
 1036 Glow-worms taken by their own light.

HETEROPTERA, ETC.

- 1040 Water Boatman (*Notonecta glauca*).
 1041 Water Scorpion devouring Larva of Dragon Fly (*Nepa cinerea*).
 1042 Silver Fish (*Lepisma*).
 1043 Aphides.
 1044 Red Centipede. *L. fonscavatus*.
 1045 Millipede. *Julus*.

ARACHNIDÆ (SPIDERS).

- 1050 Mimicking Spider (*Thomisus*), on bramble.
 1051 " with fly.
 1053 " mimicking bramble-blossom. m
 1053 Water Spider leaving its diving bell.
 1054 Water Spider in its diving hell.
 1055 Wolf Spider carrying egg-sack.
 1056 Long-legged House Spider.
 1057 Garden Orb-weaving Spider. *Epeira*.

For additional Slides on "Insects" see Index.

An entirely new series by Mr. DOUGLAS ENGLISH, entitled "Our Farmyard Friends" will be found among the Agricultural Sets on page 200 of this Section, and for Slides on Mr English's books see pages 189.

C E

BRITISH BIRDS AND NESTS.

Photographed from life by Mr. R. B. LODGE, of Enfield. Representing 106 species of British Birds, some of which, being very rarely seen in England, have been photographed in their breeding quarters on the Continent.

Beautifully Painted, 6s. 6d.; Plain Photographs, 2s. 9d. each.

- 2 Avocet's Nest (Holland).
 3 " Nest made of flamingos' feathers, and eggs. (Spain.)
 7 Little Bittern, Montenegro. *Ardetta minuta*.
 8 " " "
 10 Nest of "Little Bittern, Hungary. *Ardetta minuta*.
 11 Nest of Blackbird, with four eggs. *Turdus merula*.
 12 Blackcap on Nest. *Sylvia atricapilla*.
 13 " Nest.
 14 Bramblefinch on Twig. *Fringilla montifringilla*.
 16 Common Bunting. *Emberiza miliaria*.
 18 Reed Bunting. Cock. *Emberiza chrysophrys*.
 19 " " Nest and Eggs.
 20 " " Hen at nest feeding young.
 22 Buzzard's Nest.
 23 Capercaillie's Nest.
 24 Chaffinch. Cock. *Fringilla coelebs*.
 25 " Hen on nest.
 27 Coot. *Fulica atra*.
 28 " Nest.
 29 Nest of Little Crake, Hungary. *Porzana parva*.
 30 Nest of Spotted Crake, Hungary. *Porzana querquedula*.
 31 Cormorant standing on rock. *Phalacrocorax carbo*.
 32 Cormorant sitting.
 33 " Two birds and nest.
 34 " Nest with two eggs.
- 36 Carrion Crow's Nest and two eggs. *Corvus corone*.
 37 Cuckoo's egg in Hedge-Sparrow's Nest. *Cuculus canorus*.
 38 Young Cuckoo in Hedge-Sparrow's Nest, while below are seen a Hedge-Sparrow's egg and a dead young bird, ejected presumably by Cuckoo.
 39 Young Cuckoo in Hedge-Sparrow's Nest.
 40 Dipper's Nest. fed by Hedge-Sparrow.
 42 Turtle Dove. *Turtur communis*.
 43 " Nest and eggs.
 44 Elder Duck's Nest and eggs. *Somateria mollissima*.
 45 " Bird sitting.
 46 Stock Duck's Nest, with two eggs. *Columba oenas*.
 48 Tufted Duck. Nest.
 49 "
 50 " swimming.
 51 Wild Duck's Nest and eggs. *Anas boschas*.
 53 Booted Eagle at Nest, Spain. *Aquila pennata*.
 55 Sea Eagle (immature), Roumania. *Halidetus albicilla*.
 56 Little Egret. Pair building. *Ardea garrettii*. (Spain.)
 57 " Nest with three eggs.
 58 Spotted Flycatcher. *Muscicapa grisola*.
 59 " side view.
 60 " " Nest.

For Natural History Talks on "Birds" see Index.

BRITISH BIRDS AND NESTS—Continued.

- 62 Spotted Flycatcher.
 63 Bar-tailed Godwit wading. *Limosa lapponica*. (Lincolnshire.)
 65 Black-tailed Godwit Nest. *Lidobrigas*. (Texel).
 66 Goldfinch on thistle. *Carduelis elegans*.
 67 " Nest and eggs.
 70 Goshawk killing rabbit. Trained bird.)
 71 " Nest.
 72 Nest of Black-necked Grebe, Hungary. *Podiceps nigricollis*.
 73 Great Crested Grebe. Nest with two eggs.
 74 " Eggs covered up.
 75 Little Grebe on Nest. *Podiceps minor*.
 77 " Nest.
 79 Nest of Greenfach with eggs. *Ligurinus chloris*.
 80 Guillemots.
 82 Black-headed Gull. *Larus ridibundus*.
 83 " in winter plumage.
 85 " Nest, with three eggs.
 86 " on Nest.
 87 " in London.
 88 Lesser Black-backed Gull standing on rock. *Larus fuscus*.
 89 " " " Nest with two eggs.
 90 " " Two young birds in down.
 91 Herring Gull swimming. *Larus argentatus*.
 93 Marsh Harrier. Nest. *Circus aeruginosus*.
 93 Montague's Harrier, Nest and eggs. *Circus cinereus*. (Norfolk.)
 94 Nest of Hawfinch in hawthorn, with four eggs. *Coccothraustes vulgaris*.
 96 Foot of Sparrow Hawk.
 97 Heron standing on stone. *Ardea cinerea*.
 98 " on tree above nest, Richmond Park.
 99 Buff-backed Heron on branch of tree. *Ardea bubulcus*. (Spain.)
 101 " " " Nest with five eggs.
 102 Night Heron." *Nycticorax griseus*.
 103 " " Nest with two eggs. (Spain.)
 104 Purple Heron's Nest and three eggs. *Ardea purpurea*. (Spain.)
 105 " " " and four eggs. (Holland.)
 106 " " " and young. (Holland.)
 107 " " stepping on nest. (Automatically photographed by electricity.)
 108 Squacco Heron. *Ardea ralloides*. (Spain.)
 109 " Nest, with three eggs.
 110 Great White Heron and Young in Nest, Albania. *Ardea alba*.
 113 Wading to photograph Herons, Egrets, and Ibis in Andalucia.
 114 Hobby.
 115 Glossy Ibis. *Plegadis falcinellus*.
 116 " " with Herons. (Spain.)
 117 " " Nest and two eggs.
 118 Two Jackdaws, Albania. *Corvus monedula*.
 119 Jackdaw's Nest.
 120 Kestrel's Nest and eggs. *Falco tinnunculus*.
 121 Kingfisher. *Alcedo ispira*.
 122 " site of nest.
 123 " young bird.
 128 Black Kite's Nest, with three eggs. *Milvus migrans*. (Spain.)
 129 " Egg.
 130 Kittiwake on Nest, with egg, showing young bird. *Rissa tridactyla*.
 131 " Pair on Nest, with two young birds.
 133 " Site of Nest with birds, Farne Islands. (Medal of the Royal Photographic Society of Great Britain for these photographs.)
 133 Lapwing. Cock.
 135 Sky Lark's Nest and eggs. *Alauda arvensis*.
 136 " Young.
 138 House Martin. Nest.
- 140 " " Five Nests.
 141 " " Two Martins.
 142 Sand Martin's Nest Holes.
 143 Moorhen. *Gallinula chloropus*.
 144 " sitting.
 145 " Nest and eggs.
 147 Nightingale Nest, with four eggs. *Daulias luscinia*.
 148 " on Nest.
 149 " taking meal-worm.
 150 Nightjar on Nest. *Caprimulgus Europaeus*.
 151 " Nest and eggs.
 152 " Two young birds.
 153 " on bough.
 154 " and young.
 155 " sitting.
 156 Barn Owl. *Strix flammea*.
 157 " Young bird in down.
 158 Long-eared Owl. Young bird. *Asio otus*.
 159 " Adult.
 160 Short-eared Owl. *Asio accipitrinus*.
 161 " Ear of.
 162 " " Nest and eggs. (Norfolk.)
 163 Tawny Owl. *Syrtium aluco*.
 164 Oyster Catcher. *Hæmatopus ostralegus*.
 165 " Nest.
 166 " " Nest and eggs.
 167 Partridge's Nest, with thirteen eggs. *Perdix cinerea*.
 168 " on Nest.
 169 Dalmatian Pelicans on Nests, Albania. *Pelecanus crispus*.
 170 " Peregrine. *Falco peregrinus*. "
 172a " on perch.
 173 " killing partridge. (Trained bird.)
 174 Pheasant. Cock basking. *Phasianus colchicus*.
 175 " Nest, with twelve eggs.
 176 " Hen-bird sitting.
 177 Wood Pigeon's Nest and two eggs.
 178 Pintail's Nest.
 179 Green Plover. *Vanellus cristatus*.
 181 " " Nest, with four eggs.
 182 " " sitting.
 183 " " Young bird.
 184 Pair of Grey Plovers in summer plumage. *Squatarola helvetica*.
 185 Kentish Plover's Nest, with three eggs. *Egialitis cantiana*.
 187 Ringed Plover. *Egialitis hiaticula*.
 188 " Nest with four eggs.
 192 " Nest and eggs.
 193 Puffins. Two birds. *Fratercula arctica*.
 195 " Young bird at mouth of nest-hole.
 196 " Burrow, with egg and bird's head.
 197 Nest of Water Rail, Hungary. *Rallus aquaticus*.
 198 Raven. *Corvus corax* (Transylvania.)
 199 " Nest and eggs. *Corvus corax*. (Spain.)
 200 Redbreast. *Erythacus rubecula*.
 201 " Nest, with three eggs.
 202 Lesser Redpoll. *Acanthis ruficeps*.
 203 " Nest.
 204 Redshank's " Nest with four eggs. *Totanus calidris*.
 205 Redstart. *Ruticilla phoenicurus*.
 206 " Nest, six eggs in hole of sycamore tree.
 207 Rook. *Corvus frugilegus*.
 208 " Nest and eggs.
 209 Climbing to Rook's Nest.
 210 Ruff.
 211 Nest of Common Sandpiper.
 212 Grey Shrike on Shrub. *Lanius meridionalis*. (Spain.)
 213 Nest of Red-backed Shrike. *Lanius collurio*.
 214 Hedge Sparrow on Nest. *Accentor modulatus*.
 215 " " Nest and eggs.

BRITISH BIRDS AND NEST—Continued.

- 218 Spoonbill's Nest and six eggs. *Platalea leucorodia*, (Holland.)
 219 " Young bird in nest.
 220 " and three young in nest.
 221 " and two young in nest.
 222 Starling outside Nest in old Wood-pecker's Hole. *Sturnus vulgaris*.
 223 " Nest and eggs.
 225 " looking out of hole.
 228 Stilt Nest, with four eggs. *Himantopus candidus* (Spain.)
 229 " Egg.
 230 White Stork on Ground. *Ciconia alba*.
 231 " with young in Nest.
 232 " " Bird on Nest, with two young. (Holland.)
 234 Swallow's Nest and four eggs. *Hirundo rustica*.
 235 " on Nest.
 238 " Young.
 239 Teal.
 240 " Nest.
 242 Black Tern's Nest, with three eggs. *Hydrochelidon nigra*. (Spain.)
 243 " " on Nest.
 244 " " Two young birds in Nest.
 245 " Egg.
 246 White-winged Black Tern on Nest, Hungary. *H. leucoptera*.
 247 White-winged Black Tern, Nest.
 248 Common Tern's Nest, with two eggs. *Sterna hirundo*. (Holland.)
 249 " " on Nest.
 250 Lesser Tern's Nest, with egg and young bird. *Sterna minuta*. (Texel.)
 252 Sandwich Tern's Nest. *Sterna canniaca*.
 253 " among Bladder Campion. Egg and freshly-hatched bird and empty egg shell. (Farne Islands.)
 255 " Egg. (Spain.)
- 256 Mistle Thrush on Nest. *Turdus viscivorus*.
 257 " " Nest.
 258 Song Thrush Nest. *Turdus muscarius*.
 260 " " Nest and young.
 261 Bearded Tit. Nest.
 262 " feeding young.
 263 Blue Tit. *Parus caeruleus*.
 264 " Stump showing hole in which nest was lodged.
 265 Nest of Long-tailed Tit. *Aegithalos caudatus*.
 266 Nest of Marsh Tit (hole cut out to show nest).
 267 Griffon Vulture. *Gyps fulvus*. (Transylvania.)
 269 " " Young Bird in Nest.
 271 Pied Wagtail. *Motacilla lugubris*.
 272 " " Nest.
 273 " " Nest with young.
 274 Yellow Wagtail. *Motacilla ralloides*.
 275 " " Nest and eggs.
 278 Garden Warbler on Nest. *Sylvia hortensis*.
 279 " " Nest.
 280 Reed Warbler's Nest. *Acrocephalus scirpaceus*.
 282 " " Nest and young.
 284 Great Reed Warbler Nest. *Acrocephalus schoenobaenus*. (Holland.)
 285 Nest of Savi's Warbler. *Loenetella luscinioides*. (Holland.)
 287 Sedge Warbler feeding young. *Acrocephalus phragmitis*.
 288 " " Nest.
 289 Water Hen in Reeds.
 290 " Feeding.
 291 Whinchat Cock. *Pratincola rubetra*.
 292 " with beetle.
 294 Greater Whitethroat. *Sylvia cinerea*.
 295 " " Nest.
 297 Lesser Whitethroat, young. *Sylvia curruca*.
 300 Wren Nest. *Troglodytes parvulus*.
 301 Willow Wren. *Phylloscopus trochilus*.
 302 " " Nest, with five eggs.
 303 " " Nest, with five eggs.

CD

BIRD NOTES.

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- 7 Green Woodpeckers.
- 8 Rock and Blackbird.

- 9 Thrush breaking Snails.
- 10 Cole Tits.
- 11 Nuthatches.
- 12 Swallows.
- 13 Chiffchaff Feeding Young Cuckoo
- 14 Pied Woodpeckers.
- 15 Group of Birds—Winter-time.

TEN MINUTES TALKS.

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B Z I	BEARS	Illustrated by 13 Slides.
B Z K	ELEPHANTS	" " 17 "
B Z L	LIONS	" " 16 "
B Z M	MONKEYS	" " 17 "

CH THE COMMONER BIRDS OF OUR GARDEN— THEIR HABITS AND FOOD

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3	" Robin.	25	Jackdaw.
4	Blackbird.	26	Spotted Flycatcher.
5	" Chaffinch.	27	Wren.
6	Greenfinch.	28	Cuckoo.
7	" Rook.	29	Turtle Dove.
8	Song Thrush.	30	Hawfinch.
9	" Skylark.	31	Jay.
10	House Martin.	32	Blackcap.
11	" Swallow.	33	Butcher Bird or Red-backed Shrike.
12	Hedge Sparrow.	34	Brown-headed Sea Gull.
13	Pied Wagtail.	35	Tree-Creeper.
14	Wood Pigeon.	36	Nuthatch.
15	Plover.	37	Green Woodpecker.
16	Blue Tit.	38	Wryneck.
17	Brown Linnet.	39	Magpie.
18	Great Tit.	40	Barn Owl.
19	Yellow Hammer.	41	Kestrel Hawk.
20	Bullfinch.	42	Nightjar.
21	Swift.	43	Goldfinch.
22	" Missel-Thrush..	44	Nightingale.

CG ENGLISH BIRDS

The slides in this set are photographed from the exquisitely mounted specimens in the Natural History Museum, South Kensington, showing the birds, their nests and surroundings as far as possible in a state of nature. Many of them show the eggs or young birds.

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NOTES FOR LECTURING, 9d.

1	Bearded Tit and Nest. <i>Panurus biarmicus</i> .	29	Missel Thrush. <i>Turdus viscivorus</i>
2	Blue Tit on stump of Tree. <i>Parus Caeruleus</i> .	30	Song Thrush and Nest. <i>Turdus musicus</i>
3	Marsh Tit with young in hollow of Tree. <i>Parus palustris</i> .	31	Meadow Pipit, or Titlark, feeding Young. <i>Anthus pratensis</i>
4	Great Titmouse feeding Young. <i>Parus major</i> .	32	Tree Pipit, Nest and Eggs. <i>Anthus aboreus</i>
5	Great Titmouse with Nests made in a letterbox. 1899, 1890, 1896. <i>Parus major</i> .	33	Tree Pipit feeding Young.
6	Longtailed Titmouse with young birds on bush. <i>Parus caudatus</i>	34	Skylark feeding Young. <i>Alauda arvensis</i>
7	Great Spotted Woodpecker. <i>Picus major</i>	35	Skylark rising from the ground. <i>Alauda arvensis</i>
8	Carrion Crow with Nest and Eggs. <i>Corvus corone</i>	36	Common Flycatcher and Nest. <i>Muscicapa griseola</i>
9	Hooded Grey or Royston Crow feeding Young. <i>Corvus cornix</i> .	37	Pied Flycatcher on Tree feeding Young. <i>Muscicapa atricapilla</i>
10	Jackdaw in hollow of Tree. <i>Corvus monedula</i>	38	Kingfishers on Bank. <i>Halcyon smyrnensis</i>
11	Jay and Nest, Jays feeding Young. <i>Garrulus glandarius</i>	39	Pied Wagtail feeding Young. <i>Motacilla lugubris</i>
12	Magpie with Nest and Eggs. <i>Pica pica</i>	40	Common Crossbills on Fir Tree. <i>Loxia curvirostra</i>
13	Rock feeding Young. <i>Corvus frugilegus</i>	41	Lesser Redpoll. <i>Acanthis flammea</i>
14	Starling and Young in hollow of a tree. <i>Sturnus vulgaris</i>	42	Nightingale, Nest, and Young. <i>Phoenicia luscinia</i>
15	Bullfinch and Nest. <i>Pyrrhula europea</i>	43	Red-backed Shrike, or Butcherbird, feeding Young. <i>Lanius collurio</i>
16	Chaffinch and Young. <i>Fringilla coelebs</i>	44	Robin calling its mate. <i>Erythacus rubecula</i>
17	Greenfinch, Nest and Eggs. <i>Fringilla chloris</i>	45	Siamese and Nest. <i>Chrysococcyx siamensis</i>
18	Hawfinch and Nest. <i>Coccothraustes vulgaris</i>	46	Whitethroat and Nest. <i>Sylvia communis</i>
19	Linnets with Nest and Eggs, and Greenfinch, <i>Loxia cannabina</i>	47	Wood Wren on ground feeding Young. <i>Phylloscopus sibilatrix</i>
20	Twite and Nest. <i>Fringilla flavostris</i>	48	Blackbird watching mate on Nest. <i>Merula merula</i>
21	Common Bunting and Nest. <i>Emberiza millaria</i>	49	Blackcap feeding Young in Nest. <i>Sylvia atricapilla</i>
22	Reed Bunting and Nest. <i>Emberiza schoeniclus</i>	50	Stonechat and Eggs. <i>Pratincola rubicola</i>
23	Snow Bunting on a Rock. <i>Plectrophenax nivalis</i>	51	Wren and Nests. <i>Pratincola rubetra</i>
24	Yellowhammer. <i>Emberiza citrinella</i>	52	Nuthatch with Young. <i>Sitta caesia</i>
25	Reed Warbler feeding Young. <i>Acrocephalus streperus</i>	53	Wheatear feeding Young. <i>Saxicola eremita</i>
26	Willow Warbler and Nest. <i>Phylloscopus trochilus</i>	54	Young Cuckoo in Nest being fed by two Hedge-sparrows. <i>Cuculus canorus</i>
27	Garden Warbler. <i>Sylvia hortensis</i>	55	Long-eared Owl feeding Young with Mice. <i>Asio otus</i>
28	Chiffchaff, Nest, and Eggs. <i>Phylloscopus rufus</i>	56	Reed Warbler's Nest and Eggs
		57	Golden Plover
		58	Group of Herons on nest

CC

BRITISH BIRDS.

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- 2 Song Thrush, *Turdus naevius*
- 3 Ring-Ouzel, *Turdus torquatus*
- 4 Wheatear, *Saxicola ananthe*
- 5 Stonechat, *Pratincola rubicola*
- 6 Redstart, *Ruticilla phoenicura*
- 7 Redbreast, *Erithacus rubecula*
- 8 Nightingale, *Luscinia luscinia*
- 9 Whitethroat, *Sylvia cinerea*
- 10 Blackcap, *Sylvia atricapilla*
- 11 Dartford Warbler, *Melospophilus undatus*
- 12 Sedge-Warbler, *Aeroscopialus phragmitis*
- 13 Dipper, *Cinclus aquaticus*
- 14 Long-tailed Tit, *Acredula rosea*
- 15 Great Tit, *Parus major*
- 16 Crested Tit, *Parus cristatus*
- 17 Nuthatch, *Sitta cossia*
- 18 Wren, *Troglodytes parvirostris*
- 19 Pied Wagtail, *Motacilla lugubris*
- 20 Grey Wagtail, *Motacilla melanope*
- 21 Meadow Pipit, *Anthus pratensis*
- 22 Tree Pipit, *Anthus trivialis*
- 23 Rock Pipit, *Anthus obscurus*
- 24 Red-backed Shrike, *Lanius collurio*
- 25 Spotted Fly-catcher, *Muscicapa grisola*
- 26 Swallow, *Hirundo rustica*
- 27 Martin, *Chlidonias urbica*
- 28 Tree-Creeper, *Certhia familiaris*
- 29 Hawfinch, *Coccothraustes vulgaria*
- 30 Lesser Red-poll, *Loxia rufescens*
- 31 Bullfinch, *Pyrrhula europea*
- 32 Crossbill, *Loxia curvirostra*
- 33 Yellowhammer, *Emberiza citrinella*
- 34 Cirl Bunting, *Emberiza cirlus*
- 35 Reed Bunting, *Euphagus schoeniclus*
- 36 Chough, *Pyrhocorax graculus*
- 37 Magpie, *Pica rustica*
- 38 Rock, *Corvus frugilegus*. Jackdaws, *Corvus monedula*. Starlings, *Sturnus vulgaris*
- 39 Raven, *Corvus corax*
- 40 Skylark, *Alauda arvensis*
- 41 Nightjar, *Caprimulgus europaeus*
- 42 Spotted Woodpecker, *Dendrocopos major*
- 43 Green Woodpecker, *Picus viridis*
- 44 Wryneck, *Iynx torquilla*
- 45 Kingfisher, *Alcedo atthis*
- 46 Hoopoe, *Upupa epops*
- 47 Cuckoo, *Cuculus canorus*
- 48 Barn-Owl, *Strix aluco*
- 49 Long-eared Owl, *Asio otus*. Chaffinch, *Fringilla coelebs*. Great Blue and Coal Tits, *Parus caeruleus* and *Parus britannicus*. Goldcrest, *Regulus cristatus*
- 50 Montagu's Harrier, *Circus cinereus*
- 51 Buzzard, *Buteo vulgaris*
- 52 Kite, *Milvus fuscinus*
- 53 Peregrine, *Falco peregrinus*
- 54 Merlin, *Falco columbarius*
- 55 Kestrel, *Tinnunculus alaudarius*
- 56 Honey-Buzzard, *Pernis apivorus*
- 57 Cormorant, *Phalacrocorax carbo*
- 58 Gannet, *Sula bassana*. Gull, *Gullemota*, Herring-Gull, *Larus argentatus*
- 59 Grey-Lag Goose, *Anser cinereus*
- 60 Brent Goose, *Brenicula brenta*
- 61 Barnacle Goose, *Brenicula leucopsis*
- 62 Sheldrake, *Tadorna cornuta*
- 63 Widgeon, *Mareca penelope*
- 64 Pintail, *Anas acuta*
- 65 Mallard, *Anas boschas*. Peregrine Falcon, *Falco peregrinus*. Heron, *Ardea cinerea*. Coot, *Fulica atra*
- 66 Gadwall, *Chauliornis streperus*
- 67 Garganey, *Querquedula circla*
- 68 Tufted Duck, *Fulica a cristata*
- 69 Eider Duck, *Somateria mollissima*
- 70 Common Scoter, *Oidemia nigra*
- 71 Goosander, *Mergus merganser*
- 72 Red-breasted Merganser, *Mergus serrator*
- 73 Rock-Dove, *Columba livia*
- 74 Turtle-Dove, *Turtur communis*
- 75 Jay, *Garrulus glandarius*. Wood-Pigeons, *Columba palumbus*. Pheasant, *Phasianus colchicus*
- 76 Red-legged Partridge, *Caccabis rufa*
- 77 Partridge, *Perdix cinerea*
- 78 Quail, *Coturnix communis*
- 79 Blackcock, *Tetrao tetrix*
- 80 Capercaille, *Tetrao urogallus*
- 81 Landrail, *Crex pratincola*
- 82 Stone Curlew, *Oedicenus scolopax*
- 83 Golden Plover, *Charadrius pluvialis*
- 84 Lapwing, *Vanellus vulgaris*
- 85 Turnstone, *Streptocerus interpres*
- 86 Grey Phalarope, *Phalaropus fulicarius*
- 87 Woodcock, *Scolopax rusticola*
- 88 Dunlin, *Tringa alpina*
- 89 Knot, *Tringa canutus*
- 90 Ruff and Reeve, *Machetes pugnax*
- 91 Sanderling, *Oidridis arenaria*
- 92 Greenshank, *Totanus canescens*
- 93 Oyster-catchers, *Hematopus ostralegus*. Ringed Plover, *Charadrius hiaticula*. Little Stint, *Tringa minuta*. Curlew, *Nuimenus aquata*
- 94 Common Tern, *Sterna fuscata*
- 95 Lesser Tern, *Sterna minuta*
- 96 Black Tern, *Hydrochelidon nigra*
- 97 Great Black-backed Gull, *Larus marinus*
- 98 Black-headed Gull, *Larus ridibundus*. Pooh-ards, *Fuligula serina*. Shoveler, *Spatula clypeata*. Water Hen, *Gallinula chloropus*
- 99 Great Skua, *Stercorarius cataphractus*
- 100 Stormy Petrel, *Procellaria pelagica*
- 101 Manx Shearwater, *Puffinus anglorum*
- 102 Fulmar, *Fulmarus glacialis*
- 103 Great Northern Diver, *Columbus glacialis*
- 104 Great Crested Grebe, *Podiceps cristatus*
- 105 Little Grebe, *Tachybaptus ruficollis*
- 106 Razorbill (winter plumage), *Alca torda*
- 107 Little Auk, *Marygulus alle*
- 108 Puffin, *Fratercula arctica*
- 109 Bittern
- 110 Bearded Tit
- 111 Dotterel
- 112 Golden Eagle
- 113 Goldfinch
- 114 Ptarmigan. Winter and Autumn Plumage.
- 115 Roseate Tern. Adult and immature.
- 116 Teal. Male and Female.



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BIRDS—LECTURE I.

- | | |
|---|---|
| 1 Black Crow. | 32 Greater Puff-back Shrike. |
| 2 Head and Beak of Black Crow. | 33 Head and Beak of Greater Puff-back Shrike. |
| 3 Wattled Starling. | 34 Grey Cuckoo Shrike. |
| 4 Head and Beak of Wattled Starling. | 35 Southern Grey-headed Bush Shrike. |
| 5 Pied Starling. | 36 Nest of Bakbakiri Shrike. |
| 6 Red-shouldered Glossy Starling. | 37 Orange-breasted Bush Shrike. |
| 7 Black-headed Oriole. | 38 Black-collared Barbet. |
| 8 Nest of Black-headed Oriole. | 39 Head and Beak of Black-collared Barbet. |
| 9 Golden Oriole. | 40 Pied Babbler. |
| 10 Masked Weaver Bird. | 41 Sombre Bulbul. |
| 11 Nest of Pink-billed Weaver Bird. | 42 Cape Bulbul. |
| 12 Nest of Scaly-feathered Weaver | 43 Nest of Cape Bulbul, with egg of Cuckoo. |
| 13 Nest of Weaver Bird. | 44 Cape Penduline Tit. |
| 14 Paradise Widow Bird. | 45 Grey-backed Warbler. |
| 15 Pin-tailed Widow Bird. | 46 Nest of Crombec Warbler. |
| 16 Common Waxbill. | 47 Ground-scraper Thrush. |
| 17 Black and Yellow Bishop Bird. | 48 Nest of Cape Rock Thrush. |
| 18 Capped Wheatear or Schap-Wachter. | 49 Eastern Cape Grass Bird. |
| 19 Large Yellow Seed-eater. | 50 Cape Ground Robin. |
| 20 Nest of Large Yellow Seed-eater. | 51 Noisy Robin Chat. |
| 21 Cinnamon-backed Pipit. | 52 Head and Beak of Noisy Robin Chat. |
| 22 Orange-throated Lark. | 53 Nest of Silent Bush Robin. |
| 23 Rufous Long-hilled Lark. | 54 Paradise Flycatcher. |
| 24 Cape Wagtail. | 55 Head and Beak of Paradise Flycatcher. |
| 25 Ray's Yellow Wagtail. | 56 Nest of Paradise Flycatcher. |
| 26 Cape Long-tailed Sugar Bird. | 57 South African Hoopoe. |
| 27 Greater Double-collared Sun Bird. | 58 Head and Beak of South African Hoopoe. |
| 28 Fiscal Shrike (killing Cape Dormouse). | 59 European Bee Eater. |
| 29 Fiscal Shrike. | 60 Carnine-throated Bee-eater. |
| 30 Long-tailed Shrike. | 61 Rougous-cheeked Nightjar. |
| 31 Lesser Puff-back Shrike. | |

BYH THE NATURAL HISTORY OF SOUTH AFRICA.**BIRDS—LECTURE II.**

- | | |
|---|--|
| 1 Malachite Kingfisher and Pair of Brown-hooded
or Bush Kingfishers. | 38 Breeding Colony of Malagashas. |
| 2 Giant Kingfisher. | 39 Hammerkop. |
| 3 Pied Kingfisher. | 40 Nest of Hammerkop. |
| 4 Mouse Bird or Muis Vogel. | 41 Head and Beak of Hammerkop. |
| 5 Ground Hornbill. | 42 Darter or Snake Bird. |
| 6 Crowned Hornbill. | 43 Cattle Egret. |
| 7 Head and Beak of Crowned Hornbill. | 44 White Egret. |
| 8 Trumpeter Hornbill. | 45 Wood Ibis. |
| 9 Narina Tropic. | 46 Flamingo. |
| 10 Meyer's Parrot. | 47 Head and Beak of Flamingo. |
| 11 Head and Beak of Meyer's Parrot. | 48 South African Shelduck and Egyptian Goose. |
| 12 Ground Woodpecker. | 49 Cape Shoveller Duck. |
| 13 Cardinal Woodpecker. | 50 Head and Beak of Cape Shoveller Duck. |
| 14 Head and Beak of Cardinal Woodpecker. | 51 Red-eyed Dove. |
| 15 Nest of a Woodpecker. | 52 Nest of Turtle Dove. |
| 16 South African Wryneck. | 53 Cape Quail. |
| 17 Sparman's Honey Guide (Male). | 54 Nest of Quail. |
| 18 " " " (Female). | 55 Red-necked Pheasant. |
| 19 Didric Cuckoo. (Male.) | 56 Nest of Red-necked Bush Pheasant. |
| 20 Emerald Cuckoo. (Male.) | 57 Cape Redwing Partridge. |
| 21 Black and Grey Cuckoo. | 58 Black Crake. |
| 22 Black and Grey Cuckoo at nest of Cape Bulbul. | 59 Lesser Moor Hen. |
| 23 Great Spotted Cuckoo. | 60 Red-knobbed Coot at its nest. |
| 24 Black-crested Cuckoo. | 61 Black Stork and White Stork. |
| 25 Burchell's Coucal. | 62 Crowned Crane. |
| 26 Nest of Burchell's Coucal. | 63 Giant Bustard. |
| 27 Lourie or Plain-tail Eater. | 64 Blacksmith Plover. |
| 28 Spotted Eagle Owl. | 65 Riverside scene near Maritzburg. Solitary
Snipe and Painted Snipe. |
| 29 Barn Owl. | 66 Crowned Lapwing. |
| 30 Martial Eagle. | 67 Curlew. |
| 31 Little Sparrow Hawk. | 68 Head and Beak of Curlew. |
| 32 Black-shouldered Kite with nest and eggs. | 69 Avocet. |
| 33 Jackal Buzzard with nest and eggs. | 70 Greenshanks. |
| 34 Young Secretary Birds. | 71 Jackass Penguin. |
| 35 Secretary Bird in the act of killing a snake. | 72 Rock-Hopper Penguin. |
| 36 Kolhe's Vulture. | 73 Hya Ostrich. |
| 37 Cormorant. | |

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From Direct Photographs.

- 1 Nightingale brooding Young.
 2 Nightingale at Nest.
 3 Nightingale at Nest, alarmed by Noisy neighbours.
 4 Nightingale, Nest and Eggs.
 5 Nightingale watching Young.
 6 Robin at breakfast table.
 7 Robin at breakfast table—another view.
 8 Garden Warbler, Nest and Eggs.
 9 Garden Warbler, brooding Young.
 10 Garden Warbler—feeding time.
 11 Garden Warbler, Male at Nest.
 12 Kingfisher watching for prey.
 13 Kingfisher on post in stream.
 14 Kingfisher on bough in stream.
 15 Reed Bunting, Nest and Eggs.
 16 Reed Bunting, Young One hiding in berbage.
 17 Partridge (English), Nest and Eggs.
 18 Great Spotted Wood Pecker on tree trunk near nesting hole.
 19 Yellow Hammer, Nest and Eggs.
 20 Peewit (or Lapwing), Nest and Eggs.
 21 Swans, Hen on Nest, Cock near.
 22 Starling, adult on bough.
 23 Tree Pipit at Nest.
 24 Skylark leaving Nest containing Young.
 25 Hedge Sparrow watching Young in Nest.
 26 Hedge Sparrow cleaning Nest.
 27 Hedge Sparrow, Nest and Eggs.
 28 Sedge Warbler at Nest with Young.
 29 Sedge Warbler, Hen at Nest.
 30 Sedge Warbler—adult on twig.
 31 Nightjar eggs *in situ*.
 32 Nightjar, Young.
 33 Nightjar brooding Young.
 34 Bullfinch, feeding time, both Parent Birds at Nest.
 35 Bullfinch, both Parent Birds at Nest.
 36 Reed Warbler, both Parent Birds at Nest.
 37 Reed Warbler watching Young.
 38 Reed Warbler, Cock at Nest.
 39 Willow Wren, Nest and Eggs.
- 40 Yellow Wagtail, Hen going to Nest with food.
 41 Yellow Wagtail, both Parent Birds at Nest.
 42 Yellow Wagtail, Nest and Eggs.
 43 Swallows, three Young on branch.
 44 Swallows, Adult Male.
 45 Swallow, Adult Male.
 46 Great Whitethroat carrying food.
 47 Great Whitethroat brooding Young.
 48 Great Whitethroat Hen listening to her Mate's arrival.
 49 Great Whitethroat, Young one on Bramble spray.
 50 Great Whitethroat Cock leaving Nest.
 51 Great Whitethroat Hen carrying food.
 52 Great Whitethroat Hen cleaning Nest.
 53 Great Whitethroat, Nest and Eggs.
 54 Song Thrush covering Young.
 55 Song Thrush watching Young in Nest.

X V**NESTING SWANS.***Photographed from life by DOUGLAS ENGLISH, B.A.**Coloured Slides, 6s. each. Plain Slides, 2s. 6d. each.*

Book, "Beasties Courageous,"

- 1 Surroundings of Nest.
 2 Male Swan Gathering Nest-material.
 3 Female Swan with Clutch of Eggs.
 4 " Dropping on Eggs.
 5 Male Swan Charging on Land.
 6 " Flying to Defend Nest.
 7 " Attacking Dog in Shallows.
 8 " Rearing to Fly at Dog.
 9 Feeding Male Swan.
 10 Female Swan Trying Temperature of Water.
 11 " Coaxing Cygnets Down.
 12 Male Swan Coaxing Cygnets.
 13 " Shaking Cygnets for Attempting to Climb his Back.
 14 The Family Afloat.
 15 Back to the Nest: Male swan attending to straggler.
 16 Female Pluming herself: One cygnet sitting on an egg.
 17 Female Swan with Family.
 18 Cygnet Climbing on its Mother's Back.
 19 Female Swan Sitting with the Cygnets Beside Her.
 20 Cygnets on their Mother's Back.
 21 " "
 22 " "
 23 " "
 24 " "
 25 One Refractory Cygnet Left in Nest.
 26 Cygnets Feeding Themselves
 27 The Family Ashore.

A S DICK'S DIVE IN THE DUCK POND.—ILLUSTRATING POND LIFE.*Beautifully Painted, £4 10s.; Plain Slides, £1 10s. the Set.*

READING FOR THE SET, including "Pond Life," 2s.

An Original Story and Illustrations.

- 1 Dick Home for the Holidays, quite tired out the first day; falls asleep while looking into the Pond.
 2 Dick dreams he becomes very small, and dives into the Pond, and is introduced by a Frog to High Life below Water.
 3 Dick's introduction to Hydras and Water Fleas.
 4 Dick sees Caddis Flies and pays a visit to Colony of Caddis Worms and their queer little houses.
 5 The Fighting Community: the Water Boatmen, Water Scorpions, and Ranatra Linearis.
 6 Gnats and Gnat Larvae in their various stages.
 7 Dick visits the Water Spiders and their Diving Bell Homes, and observes the wonderful way they supply themselves with air.
 8 The Dytiscus Water Beetle and its large brown grub with its formidable jaws.
 9 May Fly Larvae and Dragon Fly Larvae, and the fully developed May Fly; Gruh of Dragon Fly chasing Grub of May Fly.
 10 Dragon Flies, the Larvae; the Fly leaving the pupa case; the perfect insect with its beautiful lace-like wings.
 11 Little Dick and his friend the Frog narrowly escape being eaten by his Father's Duck when searching for his supper.
 12 Dick at Home again, and having seen so many wonderful and beautiful things, says, "All Thy works praise Thee, O Lord."

A T**POND LIFE.**

A Series of direct Photo-micrographs.

2s. each. READING FOR THE SET, including "Dick's Dive," 2s.

a Introduction	8 Dytiscus Beetle, Traheca	18 May Fly, Perfect Insect	28 Hydra Vulgaris
1 Dragon Fly, Larva of Demoiselle	9 Dytiscus Beetle, Eye	19 Caddis Worm	29 Water Flea
2 Dragon Fly, Demoiselle (large)	10 Gyrinus Beetle, larva	20 " Fly	30 Fish Parasite
3 Dragon Fly, Larva of	11 " Perfect Insect	21 Pearl Fly	31 Palate of Water Snail
4 Dytiscus Beetle, larva	12 Gyrinus Beetle, legs	22 Water Scorpion	32 Vorticella
5 " Mouth Organs	13 Gnat Larva	23 Ranatra linearis	33 Group of selected Diatoms
6 Dytiscus Beetle, Leg showing suckers	14 " Pupa	24 Water Boatman	34 Volvox Globator
7 Dytiscus Beetle, Spiracle	15 " Male, plumed	25 Pond Skater, pupa	35 Desmids; Micraspias denticulata
	16 Mosquito	26 " Perfect Insect	36 Algae; Batrachospermum Moniliforme
	17 May Fly, Larva	27 Water Spider	

For additional Slides on Pond Life, see page 177. For a similar set to the above with lecture on "Common Insects," see page 187.

A K W**PHOTOGRAPHIC POND LIFE.**

Made direct from the Original Negatives, many of the objects being Photographed alive.

Plain Slides, 2s. each.

Printed Reading, Price 2s.

- 1 Bladderwort
- 2 Vancheria
- 3 Draparnaldia
- 4 Volvox
- 5 Volvox more highly magnified
- 6 Various Diatoms
- 7 Amoeba
- 8 Melicerta—the Brickmaker
- 10 Stephanoecetes, Crown Animalcula
- 11 Stentors, Trumpet Animalcula
- 12 Aleyonella
- 13 Fredieicella
- 14 Young Cristatella
- 15 Colony of Cristatella
- 16 Lophopus Crystallinus
- 17 Lophopus Crystallinus
- 18 Plumatella Repens
- 19 Hydra Budding
- 20 Hydra swallowing Water Flea
- 21 Cordylophora

- 22 Glass Larva
- 23 Tail of Glass Larva
- 24 Larva of Common Gnat
- 25 Pupa of Common Gnat
- 26 Common Gnat (female)
- 27 Common Gnat (male)
- 28 Head of Common Gnat (male)
- 29 Common Water Flea
- 30 Common Water Flea
- 31 Cyclops Quadricornis
- 32 Water Mite
- 33 Fresh Water Shrimp
- 34 Leptodora
- 35 Larva of Pond Skater
- 36 Pond Skater
- 37 Male Dragon Fly
- 38 Fish Louse
- 39 Young Roach
- 40 Fairy Shrimps

A R C**MICROSCOPICAL POND LIFE.**

From original drawings made directly from the living objects.

Some of these are not supplied as plain photographic Slides, but are tinted to correspond with the colours seen through the microscope. The prices are all given below.

INSECTS.

1	Mosquito Anopheles maculipennis. Male.	2s. 3d.	11	Mosquito Anopheles Culex pipiens Pupa	2s. 9d.
2	" " " Female.	2s. 9d.	12	" " " Pupae at surface	
3	" " " Scales.	2s. 3d.		of water 2s. 9d.	
4	" " " Scales in situ.	2s. 3d.	13	" " " Head of male.	
5	" " " Stomach attacked by Malaria (Model).	2s. 9d.	14	" " " Eye.	2s. 3d.
138	" " " Head in biting attitude (Model).	2s. 9d.	15	" " " Antenna.	2s. 3d.
139	" " " 2nd position.	2s. 9d.	160	" " " Egg-boat.	2s. 3d.
6	Cutex pipiens. Male.	2s. 3d.	191	" " " Another view.	
7	" " " Female.	2s. 3d.	16	" " " Culex putenensis. Head. Fe-	2s. 3d.
8	" " " Female from above.	2s. 3d.	17	Plume Gnat (Chironomus). Male.	2s. 3d.
9	Larva.	2s. 9d.	18	" " " Female.	2s. 3d.
10	Larvae at surface of water.	2s. 9d.	19	Phantom Corothra plumicornis. Head of Larva.	2s. 3d.
136	Head of Larva.	2s. 3d.	20	" " " Tail of Larva.	2s. 3d.
137	Tail of Larva.	2s. 3d.	188	" " " Egg-mass.	2s. 3d.
			189	" " " egg-mass. Part Enlarged.	2s. 3d.

MICROSCOPICAL POND LIFE.—(Continued.)

EARLY DEVELOPMENT OF THE MALARIAL PARASITE IN MOSQUITO AND MAN

- 21 Sporozoites in human blood (malaria). 2s. 3d.
 22 " entering corpuscle (malaria). 2s. 3d.
 23 Amoeboid trophozoite (malaria). 2s. 3d.
 24 Schizont (malaria). 2s. 3d.
 25 Schizont breaking up (malaria). 2s. 3d.
 26 Merozoites escaping from corpuscle (malaria). 2s. 3d.
 27 Microgametocyte with microgametes (malaria). 2s. 3d.
 28 Fertilization of macrogamete (malaria). 2s. 3d.
 29 Fertilized macrogamete (malaria). 2s. 3d.
 30 Cyst in stomach of mosquito (early) (malaria). 2s. 3d.
 31 Ripe cyst in stomach of mosquito (malaria). 2s. 3d.

SPONGES.

- 32 Freshwater Sponge. 2s. 9d.
 163 " " Young on twig. 2s. 9d.
 125 " " Skeleton. 2s. 9d.

PROTOZOA.

- 33 Amoeba radiosa. 2s. 9d.
 34 " feeding. 3s.
 126 " proteus. 2s. 9d.
 127 " injecting a diatom. 2s. 9d.
 135 " pilosa. 2s. 9d.
 35 Diffugia pyriformis. 2s. 9d.
 36 " acuminata. 2s. 9d.
 37 Nebela collaris. 2s. 9d.
 121 Euglypha alveolata. 2s. 9d.

MONADS, ETC.

- 38 Volvox globator. 3s. 6d.
 39 " " Early stages. 3s. 6d.
 152 " " Photo. 2s. 3d.
 40 Haematooccus pluvialis. 3s.
 41 Euglena viridis. 2s. 9d.
 42 Pbacus longicaudus. 2s. 9d.

INFUSORIA.

- 43 Acinet mystacina. 3s.
 44 Clathrula elegans. 3s.
 45 Actinophrys sol. 2s. 9d.
 122 Actinophaerium eichornii. 2s. 9d.
 46 Buraria truncatella. 2s. 9d.
 47 Paramecium aurelia. 2s. 9d.
 120 Paramecium caudatum. 2s. 9d.
 48 Dileptus folium. 2s. 9d.
 49 Spirostomum ambiguum. 2s. 9d.
 63 Stentor mulleri. 3s.
 50 Stylochonia mytilis. 3s.
 51 Euplotes patella. 2s. 9d.
 52 Coleps hirtus. 2s. 9d.
 53 Vorticella nebulifera. 2s. 9d.
 54 " " Life history. 3s.
 55 " " Photo. 2s. 3d.
 141 " " Photo, larger. 2s. 3d.
 142 " " Photo, high magnification. 2s. 3d.

- 61 Carchesium polypinum. 3s.
 119 " " Single animal. 2s. 9d.
 130 " " Colony on duckweed. 2s. 3d.
 131 " " Colony on duckweed. 2s. 3d.
 132 " " Larger. 2s. 3d.
 133 " " Much enlarged. 2s. 3d.
 134 " " High magnification. 2s. 3d.
 164 " " On moss. 2s. 3d.
 165 " " Same contracted. 2s. 3d.
 166 " " Colony breaking up. 2s. 3d.
 167 " " Colony breaking up, part higher magnification. 2s. 3d.
 59 Epistylis anastatica. 2s. 9d.
 60 " flavicans. 2s. 9d.

- 173 Epistylis massive colony. 2s. 3d.
 174 " " " Part enlarged. 2s. 3d.
 175 " " " Greatly enlarged. 2s. 3d.

- 56 Vaginicola. 3s.

- 57 Platycola decumbens. 2s. 9d.

- 58 Pixicola. 3s.

- 62 Cothurnia imberbis. 3s.

- 162 Lagenophryns vaginicola on Cypris. 2s. 3d.

HYDROZOA.

- 64 Hydra fusca. 2s. 9d.
 65 " vulgaris. 2s. 9d.
 66 " viridis. 2s. 9d.
 67 " " with young. 2s. 9d.
 68 " " capturing water-flea. 3s.

ROTIFERA.

- 69 Melicerta on anacharis. 3s.
 70 " ringens. 3s. 6d.
 71 " " Larger. 3s.
 72 " " Building tube. 3s. 6d.
 144 " " Photo. 2s. 3d.
 145 " Photo showing brick. 2s. 3d.
 73 Limnias ceratophylli. 3s.
 74 Stephanoceros eichornii. 3s. 6d.
 161 " crystallinus. 3s. Photo. 2s. 3d.
 75 Oecistes crystallinus. 3s.
 76 " pilula. 3s.
 77 Floscularia cornuta. 3s. 6d.
 78 " coronetta, etc. 3s.
 79 Anuraea brevispina. 3s.
 80 Noteus quadricornis. 3s.
 81 Rotifera vulgaris. 3s.
 82 Philodina aculeata. 3s.
 83 Conochilus volvox. 3s.
 84 Chaetonotus larus. 2s. 9d.

TARDIGRADA.

- 85 Water Bear. 3s.

POLYZOA.

- 86 Lepbopus crystallinus. 3s. 6d.
 159 " " Photo. 2s. 3d.
 151 " " White background. 2s. 3d.
 87 Cristatella youngi. 3s.
 160 " mucedo. 2s. 3d.
 168 Fredericella colony on submerged root. 2s. 3d.
 169 " twig. 2s. 3d.
 170 " single polype. 2s. 3d.
 171 " terminal polype. 2s. 3d.
 172 " " higher magnification. 2s. 3d.

ENTOMOSTRACA.

- 88 Daphnia pulex. 3s. 6d.
 129 " " under pressure. 2s. 3d.
 143 " antennae with parasites. 2s. 3d.
 89 Ceriodaphnia reticulata. 3s.
 128 " " Photo. 2s. 3d.
 140 " " with ephyppium. 2s. 3d.
 90 Simocephalus vetulus. 2s. 3d.
 91 " " Front view. 2s. 3d.
 92 " " Young. 2s. 3d.
 176 Sida crystallina, bead and antennae, side view. 2s. 3d.
 177 " " " " back view. 2s. 3d.
 178 " " bead, front view. 2s. 3d.
 179 " " side view. 2s. 3d.
 192 Moina rectirostris. 2s. 3d.
 183 " " Antennae (dead specimen). 2s. 3d.
 180 Eurycerus lamellatus. 2s. 3d.
 181 " " Head larger. 2s. 3d.
 93 Bosmina longirostris. 2s. 9d.
 94 Cyclocypris serena. 2s. 9d.
 95 Cyclops male. 2s. 3d.
 96 " female. 2s. 3d.
 97 " side view. 2s. 3d.
 98 " showing feet. 2s. 3d.

MICROSCOPICAL POND LIFE—(Continued).

- NEWTON—PAGE 180
- 99 Cyclops serratus male. 2s. 3d.
 100 " " female. 2s. 3d.
 101 " strenuus. 2s. 3d.
 102 Cyclops with parasitic verticellae. 2s. 3d.
 103 Canthocampus staphylinus. 2s. 3d.
 103 Canthocampus staphylinus. 2s. 3d.
 105 " " female with egg-sac. 2s. 3d.
 106 " " side view. 2s. 3d.
 87 " " limbs extend ed. 2s. 3d.
- GENERAL.
- 104 Group of Protozoa and Infusoria. 3s. 6d.
- PHANEROGAMIA.
- 118 Bladderwort with captured water-flea. 2s. 9d.
 184 Water-weed with oxygen bubbles. 2s. 3d.
- CRYPTOGAMIA.
- 105 Draparnaldia glomerata. 2s. 9d.
 106 Zygnema. 2s. 9d.
 107 Spirogyra. 2s. 9d.
 124 " Photo. 2s. 3d.
 108 Batrachospermum. 2s. 9d.
- DRSMIDIACEAE.
- 109 Group of Desmids. 3s.
 157 Desmids, various. 2s. 3d.
 110 Micrasterias rotata. 3s.
- DIATOMACEAE.
- 111 Pleurosigma attenuatum. 2s. 9d.
 146 " angulatum (high magnification). 2s. 3d.
 154 " " 2s. 3d.
 156 Pleurosigma angulatum, x 900. 2s. 3d.
 149 " formosum, x 1000. 2s. 3d.
- 112 Surirella biseriata. 2s. 9d.
 147 Surirella gamma, high magnification. 2s. 3d.
 148 Navicula rhomboides, high magnification. 2s. 3d.
 150 " lyra " " 2s. 3d.
 155 " " (dots), x 500. 2s. 3d.
 153 Amphiplexa pellucida, high magnification. 2s. 3d.
- 113 Epithemia turgida. 2s. 9d.
 114 Pinnularia viridis. 2s. 9d.
 115 Pinnularia nobilis. 2s. 3d.
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- KNOWLEDGE SERIES.
- 192 A Colony of Zoophytes (Bourgaevilla) x 10. 2s. 3d.
 193 Single Individual of the Club Zoophyte (Clava) much enlarged. 2s. 3d.
 194 Embryo Capsule of Zoophyte (Diphasia), much enlarged. 2s. 3d.
 195 Portion of Zoophyte (setularella) much enlarged, showing embryo capsules. 2s. 3d.
 196 Polypites (Coryne), much enlarged to show thread cells. 2s. 3d.
 197 Polypites (Syncoryne), much enlarged to show attached embryos. 2s. 3d.
 198 A Small Colony of Zoophytes (Hydractinia), much enlarged. 2s. 3d.
 199 Part of Zoophyte (Aglaophenia), much enlarged showing corolla. 2s. 3d.
 200 Small Colony of Zoophytes (Clytia), much enlarged, showing the Calyxes. 2s. 3d.
 201 Portion of Zoophyte (Gonothryraea), much enlarged, showing embryos attached to top of capsules. 2s. 3d.

V P

THE EVOLUTION OF A FROG.

A Series of X-Ray Lantern Slides on the Evolution from the Spawning through the Tadpole Stage to the Mature Frog, showing Absorption of the Tail and Development of Internal Organs and Skeleton.

Photographed from life by Mr. W. M. MARTIN, of Redruth.

Plain Slides, 2s. 3d. each.

The Herbivorous Period.

- 1 Spawn of Frog taken from a pool in February showing eggs embedded in a jelly-like string of mucilage.
- 2 Showing young Tadpoles after they have jerked themselves out of the gelatinous mass, as yet mouthless and living on their still unexhausted capital of yolk.
- 3 Showing development of a fish-like tail, and first appearance of portions of a short alimentary canal, also slight internal indications of the coming posterior legs.
- 4 Showing the development of a more globular shape of body, with an elongation of alimentary canal and further internal development of posterior legs.
- 5 First appearance of bone as two centres of ossification in head, also showing appearance of a rounded mouth and alimentary canal forming itself into a coil.
- 6 Showing further development of bones of head and the alimentary canal coiled up like a watch spring and extending almost from side to side.
- 7 Same period as No. 6, but radiographed through the sides and showing first appearance of centres of ossification of vertebral column.
- 8 Same period as No. 6, with exposure governed to show the portions most transparent to X Rays, seen as white dots and possibly caused by weakening of tissue to allow of exit of posterior legs?
- 9 Showing first appearance externally of the posterior legs, both appearing simultaneously, body of Tadpole larger and more elongated, with development of a bigger tail for use as a powerful swimming organ.
- 10 Same period as No. 9, with exposure to the X Rays so governed as to show the varying degrees of transparency of the skin.
- 11 Showing appearance of two additional bone centres in head. Mouth more triangular in shape. Alimentary canal extending from side to side with an enlargement of its end on left.
- 12 Alimentary canal becoming smaller, and in the two central Tadpoles, which have been kept without food, the bones of the head may now be seen articulated to the partially ossified vertebral column.
- 13 Showing further development of the bones of head. Alimentary canal still diminishing in size and more confined to right side.
- 14 Showing first indications of the coming fore-limbs, and also that the right side of vertebral column ossifies sooner than the left.
- 15 About week later than No. 14, radiographed through the sides, showing small tongue affixed to the inner side of front of lower jaw. Also as an outgrowth from the hindermost vertebrae the long spine of the backbone (see full grown stage) may be seen partially developed.

THE EVOLUTION OF A FROG—Continued

- 16 Showing final stage of development of tail to be absorbed as food in a later stage. Also the extent of development of posterior legs before the appearance of the fore limbs
 17 Showing the fore limbs in process of unfolding, Alimentary canal much diminished in size, and situated almost entirely on right side
- Commencement of the Carnivorous Period.**
- 18 Almost sudden appearance of considerably developed fore limbs, and equally sudden disappearance of alimentary canal, where the latter is visible both fore limbs have not yet appeared. Also showing fore limbs do not appear simultaneously, either right or left coming first
 19 The animal now leaps ashore. The Tadpole is becoming a Frog. The mouth has become wider, the abdomen shrunken. Transverse processes of vertebrae developing, and more Frog-like appearance evident, and being as yet unable to catch its own food, it begins living at the expense of its tail
 20 Same period as No. 19. Caught in the grass near pool and radiographed through the side, showing partial absorption of tail. Appearance of stomach, absence of alimentary canal. Compare with Radiograph of same position in Herbivorous period, No. 15
 21 About four days later than No. 20, showing the tail quarter part absorbed, and the long style of hinder-end of backbone, and produce d extremities of haunch-hones coming more plainly into view
 22 Showing tail three-quarters absorbed, and legs growing longer
 23 Showing tail externally completely absorbed, but portions still visible internally, and further development of the transverse processes of the vertebrae
 24 Complete absorption of all trace of tail, and the young Frogs through living on their own tissue have become much smaller. Bony skeleton more developed. Tongue visible through the intermandibular space. First appearance of portions of hard undigested food
 25 Showing the young Frogs, now able to capture their own food, regaining flesh. Further appearance of hard undigested portions of food. Compare with No. 23
 26 Showing appearance and gradual development of lower jaw-bone. Further growth and ossification of the skeleton
- 27 Showing ossification of upper jaw-bone—Vertebral column wider and more defined—In specimen at bottom right corner the two cerebral hemispheres of brain are visible
 28 Showing further growth of the Frogs, lengthening of limbs, and base of jaw-bone commencing to articulate with the vertebral column. Compare with No. 28
 29 Showing partial ossification of joints of fore limbs
 30 Further stages of ossification of joints of fore limbs, and of the articulation of jaw bone with vertebral column
 31 Showing a greatly increased ossification of apex of vertebral column, previous to complete articulation with jaw-bones
 32 Showing three stages of development of the cartilage of interior of head
 33 Showing jaw-bones now articulated with vertebral column, transverse processes of vertebrae longer, and in the centre. Frog the large free tongue may be seen in the intermandibular space
 34 Young Frog, showing its characteristic deeply-notched free tongue
 35 Same period as No. 34, radiographed through the side and showing an almost straight vertebral column and a thick well-developed tongue with its tip pointing down the throat
 36 Showing further stage of ossification of the articulation of jaw and vertebral column. The innermost digit of top specimen swollen—male. In bottom specimen all the digits equal in size—female
 37 Showing a larger space at the base between upper and lower jaws. Appearance of a ball and socket arrangement in joint of fore limbs
 38 Same period as Number 37, radiographed through the side, showing development of a curve in vertebral column. Compare with No. 35. Also the relative positions of the urostyle and extension of haunch-hones, when in the act of leaping
 39 A fully-developed Frog. In fore limbs showing four digits and radius and ulna completely fused together, a narrow line indicating the union. In hind limb, five toes and tibia and fibula fused
 40 An old frog with broken leg. The hind legs placed in a position to show the separate bones of the elongated ankle and the "tarsal tubercle," or well-known hint of a sixth toe

For Slides on the Evolution of a Chicken see page 204.

B F Y

By arrangement with Francis Ward, M.D., F.Z.S., F.R.P.S., we are privileged to publish the two following groups of slides from original negatives taken by him, and which appear in his well-known books, "Marvels of Fish Life," and "Animal Life under Water."

Beautifully Painted Slides, 6s. to 7s. 6d. each. Plain Slides, 2s. 6d. each.

FISH LIFE.

- Young Pike.
- Young Pike in weeds.
- Pike, third year.
- Pike watching prey.
- Pike advancing to attack.
- Pike suddenly appears.
- Pike disgusted after failure.
- Perch ready to attack.
- Perch advancing.
- Perch in the open.
- Perch paling with fear.
- Perch eggs.
- Perch hatching.
- Ruff.
- Carp.
- Carp, Mouth of, Open.
- Carp, Mouth of, Closed.
- Carp, Throat teeth of.

- Carp, Throat teeth showing triangular cartilaginous pad.
- Crucian Carp.
- Gudgeon.
- Chub.
- Chub. Throat teeth apart.
- Chub. Throat teeth showing triangular cartilaginous pad approximated.
- Dace.
- Rudd.
- Rudd taking worm.
- Tench.
- White Bream.
- Stone Leach.
- Stone Leach concealed.
- Eel.
- Stickleback building nest I

FISH LIFE.—Continued

- 34 Stickleback building nest II.
 35 Stickleback building nest III.
 36 Stickleback guarding nest.
 37 Stickleback on guard.
 38 Salmon egg and alevin.
 39 Salmon hatching I.
 40 Salmon hatching II.
 41 Salmon hatching III.
 42 Salmon hatching IV.
 43 Salmon hatching V.
 44 Salmon just hatched.
 45 Salmon five weeks old.
 46 Salmon scale. X 12.
 47 Salmon scale. X 25.
 48 Brown Trout eggs.
 49 Alevin two weeks old.
 50 Alevin five weeks old.
 51 Adult brown trout.
 52 Sea Trout.
 53 Rainbow Trout.
 54 Rainbow Trout rushing with open mouth for food—I.
 55 Rainbow Trout rushing with open mouth for food—II.
 56 Rainbow Trout, rushing with open mouth for food—III.
 57 Trout fighting—I.
 58 Trout fighting—II.
 59 Trout fighting—III.
 60 Windermere Charr.
 61 Smelt.
 62 Brown Trout laying in water hidden by reflection.
 63 Brown Trout turning to pick worms and flashing as it catches the light from above.
 64 Trout rising to fly, seen under water.
 65 Trout yawning (Air. Lungs). Mouth closed.
 66 Trout yawning (Air. Lungs). Mouth open.
 67 Trout showing fear markings I.
 68 Trout showing fear markings—II.
 69 Trout showing fear markings—III.
 70 Trout showing fear markings—IV.
 71 Plaice eggs ready to hatch.
 72 Plaice hatching—I.
 73 Plaice hatching—II.
 74 Plaice hatching—III.
 75 Plaice larval fish hatched.
 76 Flattening of the fish and rotation of cranium to adjust position of eyes.—I.
 77 " " —II.
 78 " " —III.
 79 " " —IV.
 80 " " —V.
 81 " " —VI.
 82 Plaice. Adult.
 83 Plaice ooliths.
 84 Sole.
 85 Lemon sole.
 86 Lemon sole on white background.
 87 Lemon sole in natural surroundings—I.
 88 Lemon sole in natural surroundings—II.
 89 Turbot.
 90 Thornback Ray. Egg of.
 91 Thornback Ray. Egg of.
 92 Thornback Ray. Embryo in egg.
 93 Thornback Ray. Developing—I.
 94 Thornback Ray. Developing—II.
 95 Thornback Ray. Developing—III.
 96 Thornback Ray. Back view of.
 97 Thornback Ray. One month old.
 98 Thornback Ray. Mouth of.
 99 Thornback Ray on white background.
 100 Thornback Ray in natural surroundings. Tail curled.
 101 Thornback Ray in natural surroundings. Tail extended.
 102 Dogfish. Egg of.
 103 Dogfish. Egg attached to pipe in Aquarium.
 104 Dogfish. Egg attached to rock.
 105 Dogfish fixing egg on rocks.
 106 Spined Dogfish—I.
 107 Spined Dogfish—II.
 108 Spined Dogfish laying at rest on fungus.
 109 Spined Dogfish. Spine on first dorsal fin.
 110 Spined Dogfish. Spine on second dorsal fin.
 111 Dogfish. Nursehound.
- 112 Cottus scorpio rest.
 113 Cottus alarmed.
 114 Cottus advancing to attack.
 115 Cottus gibio, Miller's Thumbe.
 116 Bleenny alarmed.
 117 Bleenny anxious.
 118 Bleenny on defensive.
 119 Black Blenny.
 120 Pollock.
 121 Whiting.
 122 Ling.
 123 Sand Eel. Mouth shut.
 124 Sand Eel. Mouth open.
 125 Pipe Fish.
 126 Pipe Fish, mouth of.
 127 Conger Eel.
 128 Goldfish egg.
 129 Goldfish. Larval. Just hatched.
 130 Goldfish, six weeks old.
 131 Goldfish, ten weeks old.
 132 Goldfish. Adult.
 133 Two Goldfish.
 134 Carp. Swim bladder of.
 135 Roach egg attached to roots.
 136 Larval roach just hatched.
 137 Larval Roach, first day. Sign of primitive swim bladder.
 138 Larval Roach, second day. Gas in swim bladder.
 139 Roach, eighteen days old.
 140 Roach, twenty-one days old.
 141 Roach, six weeks old.
 142 Roach, adult fish.
 143 Colour cells in skin of fish.
 144 Whelk devouring crayfish.
 145 Spiny Lobster.
 146 Scallop, with valves closed. *Pecten maximus*.
 147 Scallop, showing sensory tentacles.
 148 Scallop, showing mantles.
 149 Scallop, showing upper mantle and mantle cavity.
 150 Scallop, showing general features. *Pecten opercularis*.
 151 Scallop, showing eyes.
 152 Scallop following spawn into the water I.
 153 Scallop following spawn into the water—II.
 154 Scallop spat, from Blackside Oyster. Mature.
 155 Oyster spat shell.
 156 Oyster. Bundle of Broods.
 157 Oyster shell.
 158 Oyster shell.
 159 Squat Lobster. *Galathaea Strigosa*.
 160 Spider Crab.
 161 Shove Crab.
 162 Crab. Swimming or Fiddler.
 163 Crab. Swimming or Fiddler. Disturbed.
 164 Hermit Crab in sponge.
 165 Masked Crab.
 166 Circular Crab.
 167 Circular Crab. Disturbed.
 168 Plumose Anemone and colony of young on rock.
 169 Plumose Anemone.
 170 Plumose Anemone. Open and closed.
 171 Anemone Dahlia Wartlet. (*Teaha crassicornis*).
 172 Anemone. Group of *Dealisa*.
 173 Anemone (*Aneomia sulcata*).
 174 Eledene. Octopus. Forced inspiration showing funnel action.
 175 Eledene. Octopus. Forced expiration showing funnel action.
 176 Eledene, Octopus, showing pigmentation.
 177 Eledene, Octopus, showing general structure.
 178 Eledene, Octopus, showing web between tentacles.
 179 Eledene, Octopus advancing on tentacles—I.
 180 Eledene, Octopus advancing on tentacles—II.
 181 Eledene, Octopus advancing on tentacles—III.
 182 Eledene, Octopus swimming.
 183 Eledene, Octopus coming to rest—I.
 184 Eledene, Octopus coming to rest—II.
 185 Eledene, Octopus, fight with lobster—I.
 186 Eledene, Octopus, fight with lobster—II.
 187 Eledene, Octopus, fight with lobster—III.
 188 Eledene, Octopus. Lobster killed by ink.
 189 Eggs attacked by byssus—I.
 190 Eggs attacked by byssus—Nine hours later.
 191 Broken bottle dredged up.

FISH LIFE—(Continued).
ADDITIONAL SLIDES. (Knowledge Series).

Plain Slides, 2s. 3d. each.

- 192 Marked Plaice, which travelled 40 miles in 20 days, and was then recaptured (July 1905).
 193 Newly-hatched Plaice (*Pleuronectes platessa*) (February, 1909).
 194 Early Post-larval Plaice (*Pleuronectes platessa*) (February, 1909).
 195 Early Post-larval Pleuronectid (February, 1909).
 196 Post-Larval Lemon Dab (*Pleuronectes microcephalus*) (February, 1909).
 197 Head of Post-larval Lemon Dab (*Pleuronectes microcephalus*) (February, 1909).
 198 Head of Post Larval Turbot (February, 1909).
 199 Post - larval Turbot (*Rhombus maximus*) (February, 1909).
 200 Early Post-larval Thickback Sole (*Solea variegata*) (February, 1909).
 201 Post-Larval Ling (*Molva molva*) (February, 1909).

B R R

ANIMAL LIFE UNDER WATER.

A Series of slides from original negatives and drawings on the observation of Water Birds, Animals and Fishes, showing their feeding habits and haunts.

Beautifully Painted, 7s. Plain Slides, 2s. 6d.

Text Book, "Animal Life under Water," by FRANCIS WARD, M.D., F.Z.S., F.R.S.S., etc.

- 1 A Highland Loch and under-water view of the scene.
 2 Lesser Black-backed Gull, Penguin and Rainbow Trout.
 3 Appearance from under the water when the subject is partially above and partially below the surface.
 4 Methods of Subaqueous Observation.
 5 Observation Tank in the bank of a controlled stream.
 6 White Cardboard reflecting green colouration in a pond.
 7 White Anemone. I.
 8 " " II.
 9 " " III.
 10 Water Hen swimming in the area of total reflection. I.
 11 " II.
 12 White Saucer floating on the surface of the water seen from below in the area of total reflection and in the "window."
 13 Common Brown Trout reflecting its surroundings.
 14 Brown Trout waiting for food.
 15 The "flash" as the Trout turns to pick up a worm.
 16 Cormorant with berring.
 17 A flashing fish.
 18 Cormorant with wings extended.
 19 " swimming on the surface.
 20 " splashing head under water.
 21 " swimming forward with head under.
 22 " Composite slide of three above movements.
 23 " dipping in search of fish.
 24 " Under water-view, appearance of head.
 25 " Under-water view of a chase. I.
 26 " " " " II.
 27 " " " " III.
 28 " " " " IV.
 29 " " " " V.
 30 " diving.
 31 " catching fish.
 32 " floating up with fish. I.
 33 " " " II.
 34 Cormorant swimming ashore seen from below.
 35 " " " above.
 36 " digesting a meal on a rock.
 37 Penguin on land.
 38 " under water with fish.
 39 " in dark water.
 40 " on surface.
 41 " under water swimming towards observer.
 42 " away.
 43 " Composite film picture, turning fish.
 44 " " " swinging up to surface.
 45 Otter cub wandering from Hover.
 46 " Mother at Hover.
 47 " entering water.
 48 " slipping into water.
 49 " Under-water view swimming.
 50 Otter Under-water view searching for fish.
 51 " " " swinging up to surface.
 52 " " " swimming on surface.
 53 " landing with fish.
 54 " eating 2lb. sea trout.
 55 " stopping for a drink.
 56 " returning for another.
 57 " chewing a sea trout.
 58 " under a rock in the water.
 59 " playing with a pike under water.
 60 An Otter's "seal."
 61 Otter going under the ice.
 62 " coming up through the ice.
 63 " alert on bind legs.
 64 " snarling.
 65 " tail movements, composite under-water study.
 66 Seal climbing on to rocks.
 67 " struggling over boulder.
 68 " basking in the sun.
 69 " alarmed.
 70 " plunging into the sea.
 71 " vortex where it disappeared.
 72 " Under-water view searching for fish.
 73 " " " catching a herring.
 74 " " " chewing a berring.
 75 " " " swinging up to the surface.
 76 " Head above water.
 77 Heron's young on nest.
 78 Heron young bird ready to fly.
 79 " flight, going off.
 80 " wing span.
 81 " alighting.
 82 " shaking feathers after flight.
 83 " fishing attitude.
 84 " wading.
 85 " fishing.
 86 " seen below water.
 87 " wading, seen from under water.
 88 " above water against sky.
 89 " body and head seen from below.
 90 " as seen from above water.
 91 " as seen from above water.
 92 " A meal, 39 whiting in one night.
 93 " disturbed while fishing. I.
 94 " " " II.
 95 " " " III.
 96 Gull. Lesser black-backed on rocks.
 97 " " " on water.
 98 Gull. Lesser black-backed landing on water seen from below.
 99 " " " swimming on surface seen from below.
 100 " " " plunging down after fish seen from below.
 101 " Black headed, stomach contents. Natural size.
 102 " " " " Air vesicle magnified 15 diameters.
 103 " " " "

ANIMAL LIFE UNDER WATER—Continued

- | ANIMAL LIFE UNDER WATER—Continued. | | | | | | | | | |
|------------------------------------|-------|---------------------|------------------------|--|--|-----|-----------------------------|---------------------------------------|---|
| 104 | Gull. | Herring. | Stomach contents. | Otoliths and
Air Vesicles
as indication
of feeding. | | 117 | Kingfisher. | Young waiting to be fed. | |
| 105 | " | | | | | 118 | " | Alert. | |
| 106 | " | Percentage Table of | Contents of the Sea | food of Her-
ring, Com-
mon and | | 119 | " | A large fish. | |
| 107 | " | " | " | Black-headed,
of the Land | | 120 | " | Haunt. | |
| | | | | food of Her-
ring, Com-
mon and | | 121 | Angler Lures. | Dry fly as seen by a trout. | |
| | | | | Black-headed, | | 122 | " | | |
| 108 | " | Herring, | Stomach Contents, | 140 grns. | | 123 | " | throwing "line" into running "water." | |
| 109 | " | | Oats, 460 grns. Wheat. | | | 124 | The Angler | as seen from under the water. | |
| 110 | " | Black-headed, | Stomach Contents. | Crane | | 125 | " | " " below " | " |
| | | " | " | Flies. | | 126 | Salmon "Fly." | " " " | " |
| | | " | " | Ghost | | 127 | The Flashing Fly. | | |
| | | " | " | Moths. | | 128 | Miscellaneous Observations. | Male and Female | |
| | | | | | | 129 | " | Trout on the | |
| | | | | | | | | Spawning Ground. | |
| | | | | | | 130 | " | Rainbow Trout. | |
| | | | | | | | | A Fight to the | |
| | | | | | | 131 | " | Death. | |
| | | | | | | 132 | " | Rainbow Trout. | |
| | | | | | | 133 | " | Rushing at food | |
| | | | | | | | | with open mouth. | |
| | | | | | | 134 | " | Rudd taking a | |
| | | | | | | | | worm. | |
| | | | | | | | | Chub. | |
| | | | | | | | | A young Pike | |
| | | | | | | | | on the look-out. | |
| | | | | | | | | Water Hen flying | |
| | | | | | | | | under the water. | |

AY

BUTTERFLIES, INSECTS, ETC.

Photographed direct from the real objects.
Plain Slides 25; each insect 1½ in. long.

- Plain Slides 2s: each except where otherwise marked.

 - 1 Tortoiseshell Butterfly and the underside. *Vanessa Urticae*.
 - 2 Small Tortoiseshell Butterfly.
 - 3 Brimstone Butterfly, and the underside. *Gonepteryx Rhamni*.
 - 4 Peacock Butterfly and the underside. *Vanessa Io*.
 - 5 Marble White Butterfly and the underside. *Argyra Galatea*.
 - 6 Meadow Brown Butterfly and the underside (Male). *Hipparchia Janira*.
 - 7 Ringlet Butterfly. *Hipparchia Hypanthus*.
 - 8 Red Admiral Butterfly. *Vanessa Atalanta*.
 - 9 " " Wings closed.
 - 10 " " Wings open.
 - 11 Large Skipper Butterfly. *Ramphela Sylvanor*.
 - 12 Painted Lady Butterfly. *Cynthia Cardin*.
 - 13 Painted Lady Butterfly.
 - 14 Small Heath Butterfly. *Canonympha Pamphilus*.
 - 15 Orange Tip Butterfly. *Euchloe Cardamine*.
 - 16 Small Blue Butterfly. *Polyommatus Alsas*.
 - 17 Small Garden White Butterfly.
 - 18 Small Pearl-bordered Butterfly.
 - 19 Indian Butterfly.
 - 20 " " *Kallima Maches*. *Papillion*.
 - 21 Various Wings of Butterflies.
 - 22 Spurge Hawk Moth.
 - 23 Convolvulus Hawk Moth.
 - 24 Privet Hawk Moth.
 - 25 Poplar Hawk Moth.
 - 26 The Eyed Hawk Moth.
 - 27 Large Elephant Hawk Moth.
 - 28 Lime Hawk Moth.
 - 29 Ghost Moth.
 - 30 Old Lady Moth.
 - 31 Red Underwing Moth.
 - 32 Yellow Underwing Moth.
 - 33 Scarlet Tiger Moth.
 - 34 Buff Tip Moth.
 - 35 Swallow-tailed Moth.
 - 36 Large American Silkworm Moth.
 - 37 Curvant Moth.
 - 38 Death's Head Moth.
 - 39 Emperor Moth.
 - 40 Moth of the Vegetable Caterpillar. *Hepialus Vitescens*.
 - 41 Skin of Caterpillar of Emperor Moth.
 - 42 Vegetable "Caterpillar" of New Zealand. For "Natural History of New Zealand".
 - 43 " " feeding in Webs.
 - 44 Two Caterpillars of Comma Moth.
 - 45 Caterpillar of Ermine Moth.
 - 46 Caterpillar on Euonymus, in Webs.
 - 47 Caterpillar, "Geometer, representing a Stick.
 - 48 Indian Long Horn Beetle.
 - 49 Great Silver Beetle. *Hydrophilus Piceus*.
 - 50 Sailor Beetles.
 - 51 Musk Beetle. *Aromia or Cerambyx Moschatus*.
 - 52 Stag Beetle. *Lucanus Cervus*.
 - 53 Cockroach. *Blatta*.
 - 54 Dragon Fly.
 - 55 " " (Male).
 - 56 " " Demoiselle.
 - 57 Smoked-winged Dragon-flies (Male and Female).
 - 58 Chinese Lantern Fly.
 - 59 Drone Fly on Sunflower.
 - 60 Ant Lion.
 - 61 Garden Snails feeding on Leaf.
 - 62 " " on top of Flower.
 - 63 Large Green Grasshopper.
 - 64 Frog Hopper, Stag Horn, Indian Tea Tree.
 - 65 Aphis on Leaf Stalk.
 - 66 Black Ants.
 - 67 Earwigs.
 - 68 Spiders.
 - 69 Three Scorpions.
 - 70 Scorpion, underside.
 - 71 " three-quarters.
 - 72 Water Scorpion.
 - 73 Shrimp.
 - 74 Freshwater Shrimp.
 - 75 Centipede.
 - 76 Star Fish.
 - 77 " 5 Ray and 13 Ray.
 - 78 Dytiscus, Water Beetle.
 - 79 Group of Larva of Dytiscus Margilatus.
 - 80 Water Mantis, *Ranatra Linearis*.
 - 81 Crah.
 - 82 Unfolding Wings of Insects. Crumpled appearance of the wings upon emergence from the nymph skin. 2s. 3d.
 - 83 Insect hanging erect, the wings beginning to unfold.
 - 84 Wings nearly dry. 2s. 3d.

A X BRITISH BUTTERFLIES AND MOTHS.

Photographed from a very beautiful and accurate Series of Original Drawings.

Beautifully Painted 6s.; Plain Slides, 2s. each.

- | | |
|---|--|
| 1 Slide containing 12 Butterflies and Moths for Wing Development | 17 Humming Bird Hawk Moth. Larva and pupa <i>Microtus Stellatarum et Groatica</i> . On he straw |
| 2 Swallow-tail Butterfly. <i>Papilio Machaon</i> | 18 Broad and Narrow Bordered Bee-Hawk Moths. <i>Hemaris Bombyliformis et Fuciformis</i> . On honeysuckle |
| 3 Swallow-tail Scarce Butterfly. <i>Papilio Podalirius</i> | 19 Burnett Moths, six and five spot. <i>Zygaena Filipendula et Lonicera</i> . On clover |
| 4 Apollo Butterfly. <i>Parnassius Apollo</i> | 20 Scarlet and Jersey Tiger Moths. <i>Callimorpha dominula et Hera</i> . On nettle |
| 5 Clouded Yellow Butterfly. <i>Colias Hyale et Edusa</i> . On Clover | 21 Garden and Cream Spot Tiger Moths. <i>Arctia Caja et Villica</i> . On blackberry spray |
| 6 Red Admiral Butterfly. <i>Vanessa Atalanta</i> | 22 Emperor Moths, male and female. <i>Saturnia Carpini</i> . On spray of wild rose |
| 7 Camberwell Beauty Butterfly. <i>Vanessa Antiope</i> | 23 Oak Egger Moths. <i>Lasiocampa Quercus</i> . On blackberry |
| 8 Peacock Butterfly. <i>Vanessa Io</i> | 24 Puss Moth. <i>Cerura Vinula</i> . On willow |
| 9 Tortoiseshell and Comma Butterfly. <i>Vanessa Urticaria et C. Album</i> | 25 Common Yellow Underwing Moths. <i>Triphena Pronuba</i> . On primrose |
| 10 Painted Lady Butterfly. <i>Vanessa Cardui</i> . On thistle | 26 Crimson Underwing Moth. <i>Calocala Sponsa</i> . On oak spray |
| 11 Silver-washed Fritillary Butterfly. <i>Argynnis Papilio</i> . On pansy | 27 Clifton Nonpareil Moth. <i>Catocala Fraxina</i> . On poplar |
| 12 Purple Emperor Butterfly. <i>Apatura Iris</i> . On poplar spray | |
| 13 Marble White Butterfly. <i>Melanargia Galathea</i> | |
| 14 Hippershaw Cirsie | |
| 15 Death's Head Moth. <i>Acherontia Atropos</i> | |
| 16 Convolvulus Hawk Moth. <i>Sphinx Convolvulus</i> | |

A B T LIFE HISTORY OF VARIOUS INSECTS.

A Series of Lantern Slides photographed direct from the actual objects, and showing on the one slide the perfect insect, male and female, the caterpillar, and the chrysalis. The colouring is copied from the insects themselves, to secure accuracy, and the resulting slides are exquisitely delicate and beautiful.

Plain Slides, 2s. each; Beautifully Painted, best quality, 6s. each.

MOTHS.	BUTTERFLIES.
Male and Female, Pupa and Larva.	19 Swallow Tail. <i>Papillio Machaon</i> .
1 Eyed Hawk, <i>Sphinx Ligustrum</i>	20 Red Admiral, <i>Vanessa Atalanta</i> .
2 Lime Hawk, <i>Smerinthus Tiliæ</i>	21 Small Garden White, <i>Pieris Rapæ</i> .
3 Poplar Hawk, <i>Smerinthus Populi</i>	22 Mole Cricket, Flying, and in Barrow.
4 Privet Hawk, <i>Sphinx Ligustrum</i>	23 Scorpions from Spain.
5 Lappet Moth, <i>Bombyx Quercifolia</i>	24 Great Silver Beetle.
6 Drinker, <i>Odonestris Potatoria</i>	25 Goat Moth.
7 Oak Egger, <i>Lasiocampa Quercus</i>	26 Swallow-tail Moth.
	27 Privet Hawk.
	28 Great Water Beetle.

For additional Slides on "Insects" see Index.

A F E**SPIDERS.**

From Direct Negatives.

- 1 Spider's Nest, showing Eggs just before Hatching.
- 2 Spider's Nest, showing the Shells directly after the Spiders have left the Eggs.
- 3 Garden Spider and its Web
- 4 Magnified.
- 5 " " The Spinners.
- 6 " " The Foot, showing the Comb Formation of the Claw.
- 6A Spider's Foot. x 25.
- 7A " Tongue. x 35.
- 7 " " Mandibles of the Male Spider.
- 8 " Eyes of.
- 9 Spider, Bush.
- 10 " Cellar.

Plain Slides, 2s. each.

- | | |
|--|---|
| 11 Spider, Craobh. | 11 Spider, Craobh. |
| 12 " Ground. | 12 " Jumping. |
| 13 " " Jumping. | 13 " Trapdoor, Young. |
| 14 " " Water. | 14 " Wolf. |
| 15 " " Water. | 15 " Spiny, from Trinidad. |
| 16 " " Water. | 16 Foot of Bird-catching Spider. |
| 17 " " Water. | 17 Hair of Bird-catching Spider, showing the fluted ends and fine hairs, x 300. |
| 18 Foot of Bird-catching Spider. | 18 Foot of Bird-catching Spider, showing the fluted ends and fine hairs, x 300. |
| 19 Nest of Harvest Spider in Seed-head of Grass. | 19 Nest of Harvest Spider in Seed-head of Grass. |
| 20 Spider, Zehra. | 21 Spider, Zehra. |

B Y P**LIFE HISTORY OF THE ANT.**

A series of 30 Slides. Detailed list will be sent on application.

Coloured Slides, 6s. Plain Slides, 2s. each.

Typewritten Notes, price 2s. 6d., or can be loaned with the Slides.

BYP

FLIES—THEIR VARIOUS SPECIES

Plain Slides, 2s. 3d. each.

- | 1 | | House Fly from mounted specimen. | | |
|----|---------------|--------------------------------------|----|--|
| 2 | " | killed by fungus. | 24 | Blow Fly. Tongue of (highly magnified). |
| 3 | " | Section through whole (V.S.). | 25 | " " Tongue of Central tube. |
| 4 | " | Foot with hairs and pad. | 26 | " " Spiracle. |
| 5 | " | Antennae. | 27 | " " Tracheal tubes. |
| 6 | " | Eye (V.S.) | 28 | " " Oral lobes. |
| 7 | " | Eye. | 29 | " " Eggs of, |
| 8 | " | Spiracle and part of skin with hair | 30 | " " pupae. |
| 9 | " | Tracheae and Spiracle. | 31 | Biting Fly (<i>Stomoxys calcitrans</i>) Foot. |
| 10 | " | Wing. | 32 | Bot Fly. Larva in egg. |
| 11 | " | Tongue. | 33 | " eggs. |
| 12 | " | Section of. | 34 | " of Ox. (<i>Hypoderma bovis</i>). |
| 13 | " | Eggs of (Cluster). | 35 | " of Sheep. |
| 14 | " | Ovipositor with eggs in situ. | 36 | Corn Fly. |
| 15 | " | Larva of. | 37 | Dancing Fly. (<i>Hilara cilipes</i>) Female. |
| 16 | " | Parasite of. | 38 | Dung Fly. (<i>Scatophaga stercoraria</i>). Feet. |
| 17 | Chelifer Fly. | Eggs of. | 39 | Fantail Fly. Male. |
| | BLOW-FLY. | | 40 | Fruit Fly. |
| 18 | Blow Fly | | 41 | Gad Fly. Lancets of. |
| 19 | " | Anatomy of. Various parts dissected. | 42 | Green Bottle Fly. Head. |
| 20 | " | Head. (Front View.) | 43 | Hessian Fly. |
| 21 | " | Eye. | 44 | Wheat Midge. |
| 22 | " | Foot. | 45 | Tsetse Fly. (<i>Glossina palpalis</i>). |
| 23 | " | Tongue of. | 46 | Tropical and Malaria Fly. |
| | | | 47 | Yellow Fever Fly. |

See also **A B Z** "The Danger of Flies," Medical, Section I of this Catalogue.

A B S THE LIFE HISTORY OF A BRITISH MUD-WASP ODYNENIS SPINIPES.

Photographed from Life by DOUGLAS ENGLISH, B.A., F.R.P.S.

Coloured Slides, 6s.; Plain Slides. 2s. 6d. each

- 1 The Mud-Wasp, O. Spinipes,
Back.
2 The Mud-Wasp, O. Spinipes,
Side.
3 The Mud-Wasp, O. Spinipes,
Three-quarters.
4 General View of a Collection
of Burrows, with Tubular
Crowns.
5 General View of a Collection
of Burrows, with Tubular
Crowns, after Rain-storm.
6 Wasp commencing a Burrow.
7 " " Side.

8 Section of New Burrow,
showing Suspended Egg
and First Caterpillar.
9 Section of Burrow, with
Store of Caterpillars.
10 Section of Burrow, with
Store of Caterpillars, with
Partition half-way down.
11 Section of Burrow, showing
Wasp Grub Feeding.
12 Section of Burrow, showing
Wasp Grub Full Fed.
13 Section of Burrow, showing
Wasp Pupa in Cocoon.
14 Wasp Grub, surrounded by
Store of Caterpillars.
15 Wasp Pupa.
16 Wasp bringing Caterpillar to
Burrow Entrance, Side.
17 Wasp bringing Caterpillar to
Burrow Entrance, Three-
quarters.
18 Wasp Repairing Burrow En-
trance.
19 Wasp Hanging on Burrow
Entrance, Side.
20 Wasp Hanging on Burrow
Entrance, Back.

A V

INSECT MIMICRY

Photographed from Original Drawings.

Beautifully Painted, 6s. : Plain Slides, 2s. each.

NOTE.—When ordering Slides the Telegraphic Code Letters should be quoted to avoid mistakes.

TI

HIDDEN BEAUTIES OF NATURE.

By permission of the Religious Tract Society.

From photographs and original drawing by RICHARD KERR, Esq., F.G.S., author of
"Hidden Beauties of Nature."*Descriptive Lecture for the 59 Slides 1s. 3d.; Plain Slides, 2s. each.*

- 1 The Beautiful Floscule (*Floscularia ornata*). Below the range of unassisted sight. Found in Pond water.
- 2 A Glass Sponge (*Euplectella speciosa*). The glass or silty skeleton of a sponge found in the waters near the Philippine Islands. The first specimens were thought to have been the clever workmanship of the Chinese or Japanese and fetched as much as £50 apiece. Now they can be purchased £1. 3s. 6d.
- 3 Another form of "Glass Sponge" (*Euplectella subera*).
- 4 Another Glass Sponge (*Euplectella cucumeris*)
- 5 A Glass Sponge (*Euplectella Phormis*)
- 6 " (*Euplectella aspergillum*)
- 7 " (*Euplectella Jovis*)
- 8 Sponge Spicules (Microscopic)
- 9 A thin section of the Spike of a Sea-Urchin, $\frac{1}{10}$ th of an inch in diameter
- 10 Transverse sections of Spikes of Sea-Urchins. Enlarged
- 11 Parts of Sea-Urchin. Reduced
- 12 The Echinus, or Sea-Urchin. The Spikes removed
- 13 Some of Nature's Fireworks. Organisms which use the phosphorescence of the Sea
- 14 Globigerina bulloides. Very greatly magnified. "Atlantic Ooze" from a depth of $\frac{2}{3}$ miles
- 15 A thin Slice of Chalk. Very greatly magnified.
- 16 Polycystina. The composition of the Rocks of Barbados. Enlarged several hundred diameters
- 17 Polycystina, Island of Barbados. Enlarged many hundred diameters
- 18 Radiolaria, Challenger Series
- 19 " " " (Tuscarora)
- 20 " " "
- 21 " " "
- 22 " " "
- 23 " " "
- 24 " " "
- 25 " " "
- 26 " " "
- 27 " " "
- 28 " " "
- 29 " " "
- 30 " " "
- 31 " " "
- 32 " " "
- 33 A Radiolarian, Challenger Series
- 34 Triceratium. A Diatom enlarged several hundred diameters
- 35 Heliopelta. Enlarged several hundred diameters
- 36 Coseinodiscus radiatus. A Diatom enlarged several hundred diameters
- 37 Eggs of a tiny Moth. Enormously magnified
- 38 Foramenifera. Greatly enlarged
- (A) Encrusting Limestone
- (B) Nummulitic Limestone
- (C) Coralline Limestone
- 40 Diffugia, Fresh-water Rhizopods (after Leidy). Ranging from the $\frac{1}{100}$ th to the $\frac{1}{20}$ th of an inch in diameter
- 41 Nehela, Fresh-water Rhizopods (after Leidy). All are below the $\frac{1}{20}$ th of an inch in diameter
- 42 Hyalosphenia papilio (after Leidy). Ranging from $\frac{1}{20}$ th of an inch to the $\frac{1}{10}$ th of an inch
- 43 Clathrulina elevans, Fresh-water Rhizopods (after Leidy) Diameter $\frac{1}{100}$ th of an inch
- 44 Arcella, Fresh-water Rhizopods (after Leidy). From $\frac{1}{100}$ th of an in h to $\frac{1}{20}$ th of an inch
- 45 Cyphoderia, Fresh-water Rhizopods (after Leidy) $\frac{1}{50}$ th of an inch in diameter
- 46 Coral Polyps
- 47 Corals with extended Polyps
- 48 Madrepores. (South Kensington Natural History Museum)
- 49 Madrepore ortherae
- 50 Building Rotifer (*Melioorta ringens*) $\frac{1}{50}$ th of an inch in length
- 51 Volvox Glutator $\frac{1}{50}$ th of an inoh in diameter
- 52 Snow Crystals
- 53 Crystals formed by breathing on a window during frost. The photograph, taken through the microscope by Dr. Maddox, embraces only $\frac{1}{50}$ th of an inch
- 54 A small portion of Eye of Water Beetle (*Dytiscus marginalis*). Enormously magnified
- 55 A small portion of Eye of House-fly
- 56 A portion of a Blow-fly's Proboscis. Enormously magnified
- 57 Four Flints, showing Silicified Sponges, known as "Choasites"
- 58 Silicified Sponges in Flint
- 59 A Glass Sponge fossilised in Chalk. *Guttardia Stellata* (Michelin) *Brachiolites angularis* (Toulmin Smith)

For other Slides of these subjects, see Index & Science, Section 2, of this Catalogue.

AP COMMON INSECTS AS SEEN THROUGH THE MICROSCOPE.

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- 8 Trahea of Silkworm
- 9 Tracheal Tube more highly magnified
- 10 Spiracle of Beetle
- 11 Gizzard of Cricket
- 12 The Spider
- 13 " Spinnerets
- 14 " Foot of
- 15 House-fly
- 16 " Foot
- 17 " Eye
- 18 Head of Crane-fly
- 19 Proboscis of Blow-fly
- 20 " more highly magnified
- 21 Saws of Saw-fly
- 22 Ichneumon-fly
- 23 Indian Fire-fly
- 24 Human Flea, male
- 25 Human Flea, female
- 26 " Bug
- 27 Parasite of Sheep
- 28 " Pig
- 29 " Flying Fox
- 30 Hive Bee's Tongue
- 31 " Leg, showing Pollen
- 32 " Wing showing Hooklets
- 33 " Sting showing Barbs
- 34 Head of Butterfly
- 35 Antenna of Moth
- 36 Dust from wing of Butterfly

For a similar set to this, with Lecture on "Pond Life," see page 178.

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- 3 " Garden.
- 4 " House.
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- 6 Section of Bee's Eye, x 40.
- 7 Eye of Beetle, showing a picture (Portrait of the King) in each lens, 2s 6d.
- 8 Trophy of Dor Beetle, *Geotropes mutator*, showing the parts of the head dissected.
- 9 Anatomy of the Blow-fly, *Musca vomitaria*. The whole insect dissected and parts separated on the one slide.
- 10 Blow-fly, Female.
- 11 " Central Tube of Tongue highly magnified.
- 12 Plant Bug, *Tingis cardui*.
- 13 Plant Bug.
- 14 Antennae of Cockchafer.
- 15 Spiracle of Fly.
- 16 Fruit Fly, *Trypetia*.
- 17 Wing of Lacewing Fly.
- 18 Parasite Fly, *Conops quadrifasciata*.
- 19 Window Gnat.
- 20 Gooseberry Sawfly.
- 21 Hallotis Tulerculata, Palate.
- 22 Laburnum Moth.
- 23 Head of Silkworm Moth.
- 24 Eggs of House Fly.
- 25 " Parasite of Ground Hornbill.
- 26 " Parasite of Reeves' Pheasant.
- 27 " Parasite of Goose.

28 Scales of Insects arranged as a Basket of Flowers and Butterflies.

- 29 Spicules of Synapta.
- 30 Spine of Acrocladia. T.S.
- 31 Spines of Star-fish.
- 32 " Young Echinus.
- 33 Spine of Echinus. T.S.
- 34 Sting of Wasp compared with Eye of Smallest Needle.
- 35 " with Point of "
- 36 Hydrozoan Zoophyte with tentacles extended. *Obelia flabellata*.
- 37 Bryozoa Malaga.

BOTANICAL.

- 38 Sunflower Stem, T.S.
- 39 Seed of *Nemoria strumosa*.
- 40 Leaf of *Drosera rotundiflora*, showing captured insect.
- 41 Maidenhair Fern.
- 42 Section of Bamboo Cane.
- 43 " Pepper.

FORAMINIFERA.

- 44 Sea Soundings.
- 45 " 1,750 fathoms. Lat. 52° 40', long. 15° 58'.
- 46 " The "Challenger" Expedition, 1,750 fathoms.
- 47 Foraminifera, Mediterranean, 420 fathoms.
- 48 " Group.
- 49 " Alveolina."
- 50 Dendrolina.
- 51 Nodosaria.
- 52 Arenacesus.
- 53 " Arenacesus.

54 Nubecularia nucifuga.

- 55 Orbiculina.
- 56 Peneriples.
- 57 Peneroplis.
- 58 Putvinulina menardi.
- 59 Quinqueloculina.
- 60 Diatoms, Selected.
- 61 " Triceratium favis, x 100.

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- 62 Group of Various Eggs.
- 63 Eggs of Moth.

POLARISED OBJECTS.

- 64 Salicine.
- 65 Citric Acid.
- 66 Oxalic Acid.
- 67 Chlorate of Potash.
- 68 Claw of Wild Cat.
- 69 Toe of White Mouse.
- 70 Satin Spa.

VARIOUS.

- 71 Normal Lungs, x 20.
- 72 Coal Miner's Lungs, x 20.
- 73 Sweep's Lung, x. 20.
- 74 Yeast Plant, x 1000.
- 75 Paste Mould, x 70.
- 76 Cotton Fibre, x 125.
- 77 Micrococcus Bacilliacei, x 1000 (Bacillus of Acetic Acid).
- 78 Diamonds, etc., from Canon Diablo Meteorite, x 35.
- 79 Thames Water at Brentford, x.
- 80 " Hungerford, x.
- 81 " Lambeth, x.
- 82 " Kingston, x.
- 83 Cistern Water, x.
- 84 Sewer Water.

Nos. 111-120 are all taken at the same magnification X7.

- 111 Bed Bug (*Cimex lectularius* Linneaus). Male.
- 112 " " " Female.
- 113 Flea, Male. (*Pulex irritans*) " "
- 114 " Female.
- 115 Head Louse. (*Pediculus Capitis*.)
- 116 Body Louse. (*Pediculus Vestimenti*). Male and Female. Larvae and Egg.
- 117 Crab Louse. Male. (*Pediculus*.)
- 118 Crab Louse. Female.
- 119 Itch Insect. (*Sarcopeltis Scabiei*). Male and Female. Larvae and egg.
- 120 Chigoe Sarcoptes, gallinaceous pulex penetrans. Ceylon.
- 121 Dog Flea. (*Pulex Canis*.)
- 122 Sheep Tick. (*Melophagus ovis*.)
- 123 Saw Fly. (*Tenthredo variata*.)
- 124 Crab Louse. Male.
- 125 Harvest Bug.
- 126 Crab Louse.
- 127 Stable Fly.
- 128 Trichopteron tenuirens.
- 129 Itch Insect, Male and Female. Larvae.
- 130 Head Louse.
- 131 Chigoe Pulex penetrans.
- 132 Head of Flea.
- 133 Head of Flea, Ear organ.
- 134 Body Louse, Male.
- 135 " " Female.
- 136 Skin or moult of Bug.
- 137 Eggs of Bed Bug.

- 85 The Anchor Plates of the Synapta.
- 86 Brown Cassida India Platypria echidna.
- 87 Eels from Vinegar X 55.
- 88 The side view of a Nautilus Shell.
- 89 "
- 90 X Ray Photograph of a Shell.
- 91 Bacilli in Milk.
- 92 Cockles and Mussels. The shells open and closed to show hinges.
- 93 Eggs of the Magpie Moth X 10.
- 94 Foot of Leaf-cutter Bee X 12.
- 95 The head of a Water Boatman X 12.
- 96 Foot of a Water Beetle Δ 16.
- 97 Tongue of the Butterfly X.
- 98 Foot of Blow-fly showing pad X 70.
- 99 Eyes of Spider X 12.
- 100 Prepared salt X 30.
- 101 Foraminifera Deep-sea Soundings. 40 fathoms.
- 102 " " " 110 "
- 103 " " " 166 "
- 104 " " " 200 "
- 105 " " " 267 "
- 106 " " " 1,120 "
- 107 The Hornet.
- 108 Death-watch Beetle. Life History.
- 109 Holes made by Beetle.
- 110 Cut section showing borings.

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| 31 Plan of the Zoological Gardens. | 51 Persian Gazelle. | 92 Chameleon |
| 52 Crowd at the Zoo. | 52 Himalayan Bear. | 93 Chimpanzee, "Micke," West Africa |
| 53 Cheetah. | 53 Axis or Chital Deer. | 94 Chinchilla |
| 54 Polar Bear begging. | 54 Head of Rhinoceros. | 95 Bon Constrictor |
| 55 Kangaroos. | 55 Sea Lion Enclosure. | 96 Crocodile |
| 56 Persian Gazelle. | 56 Head of Wapiti Deer. | 97 Squirrel Dorsal, Central America |
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| | | 107 Raccoon, N. America |
| | | 108 Viscacha, Argentine |
| | | 109 Common Wolf, Siberia |
| | | 110 Grevys Zebra, Abyssinia |
| | | 111 A Grevy's Zebra and Foal, presented by H.M. the King |
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| 3 Lion " | 37 Reindeer | 71 Nasaque |
| 4 Lioness | 38 Moose | 72 Papyhara |
| 5 " Head | 39 Nylghau | 73 Sea Lion |
| 6 Lion and Lioness | 40 Mule or black-tailed Deer | 74 Seal |
| 7 Tiger | 41 Adder | 75 Hairy Armadillo |
| 8 Bengal | 42 Gnu | 76 Porcupine |
| 9 " at full length | 43 Hartebeest | 77 Giant Tortoise |
| 10 " Head | 44 Malacca Deer | 78 Tortoise Yard |
| 11 African Elephant | 45 Zebra | 79 Rohrbn Island Snake |
| 12 " Head | 46 Zebra "Burchell's" | South Africa |
| 13 Indian " | 47 " young | 80 Mexican Bull Snake |
| 14 " children" with | 48 Wild Ass, "Asiatic" | 81 Tigrine Frog, commonly called the Indian Bull Frog |
| 15 Bear climbing a pole | 49 Goat | 82 Fringed Gecks from Madagascar |
| 16 Polar Bear (aged) | 50 Ibex | 83 The White-throated Monitor |
| 17 Polar Bear (young) | 51 Yak | 84 Gould's Monitor from Australia |
| 18 " coming out of water | 52 Barbary Sheep | 85 Land Iguana from the Galapagos Islands |
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| 26 Camel, Bactrian | 60 Dingo | |
| 27 Dromedary | 61 Bison | |
| 28 Llamas | 62 Eland | |
| 29 " side view | 63 Indian Buffalo | |
| 30 " Guanacos | 64 Zebu (Sacred Ox of India) | |
| 31 Giraffe | 65 Zulu, male & female | |
| 32 Kangaroo | 66 Gayal, Indian | |
| 33 Rat Kangaroo | 67 Wild White Cattle | |
| 34 Gazelle | 68 Gibbon Ape | |

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115 Eagle Hawk
116 " Ta 'ny
117 " Bateler
118 " Great Sea
119 " Lesser Sea
120 Vulture, Bearded
121 Ostrich
122 Rhea
123 Secretary Bird
124 Flamingoes
125 Stork, Common
126 " White
127 " Marabout
128 " " The Council of Three"

- 129 Pelicans
130 Cassowary
131 Crane, Common
132 " Australian
133 " Stanley
134 " Watuled
135 " Cape Crowned
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137 Egret
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6 dressed in Wolfskins
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8 Elephant Hunter on h' Trunk
9 " protecting Young from Kaffir Spearmen
10 " harnessed for War, Indian Battle
11 " driven into Corral by Natives. Night Scene
12 Hippopotamus Trap, the Downfall of the Spear
13 Hog Spearing. Indian Officers with Dogs
14 Kangaroo Hunt with Dogs in Australia
15 Killing the Panther, saving Huntsman's life
16 Lion Hunting, killed by Elephant with branch
of Tree, and Sportsman rescued
17 Lion attacks Dr. Livingstone, and s' of by Native
18 Lions fighting

- 19 Maldonata bound to a Tree, and protected from Wild Beasts by a Panama
20 Shooting White Rhinoceros, Sportsman concealed on Bank of Stream. Night Scene
21 Reindeer Shooting
22 Seal Spearin in Greenland, from Canoes
23 " How to Shoot
24 Snake Hunting by Natives of Australia
25 Tiger Hunting on Elephants in Indian Jungle
26 " Death Spring, seizes head of Elephant
27 " fighting with Gladiator, Coliseum, in Rome
28 " and Alligator fighting
29 " strikes down Lieut. Rice, shot by Huntsman
30 " shooting by Native, Decoy Goat. Man for Dinner, Goat for Supper
31 Walrus Spearin from Boats, Greenland
32 " Battle with King of the Frozen Seas
33 Whaling, Whale harpooned
34 Wild Horse, Hunting with Lasso, South America
35 Wolves and Russian Traveller. Noble Sacrifice
36 Wolf Pit for Trapping Wolves, Lamb as Decoy

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"THE ROMANCE OF THE ANIMAL WORLD."

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38 A Wolverine stealing a Gridiron. This is a very mischievous beast.
39 A Brave Walrus, protecting her young one from the hunter.
40 A Kaffir Lion Hunt.
41 An Alligator and Peccary. An unexpected meal.
42 A Jaguar up a tree attacked by Peccaries. Besieged.

- 43 A Fight between a Whale and Swordfish. Three versus one.
44 A Wolf pleading for life. Awaiting the Judgment.
45 An Eagle Attacking an Osprey. Highway Robbery.
46 Beavers felling a tree.
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17 Otter.	36 Mountain Hare (Winter.)	
18 Badger.	37 Rabbit.	
19 Pine Marten.	38 Red Deer.	

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SOUTH AFRICAN MAMMALS

These Slides are taken from the fine illustrations in "The Natural History of South Africa," published by Messrs. Longmans, Green & Co.

B Y I NATURAL HISTORY OF SOUTH AFRICA.

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5 A mother Vervet and her baby.	10 Chacma Baboon.

NATURAL HISTORY OF SOUTH AFRICA.—Continued.

MAMMALS—LECTURE I.—Continued.

- 11 Skull of Chacma Baboon.
- 12 A youngster of the Baboonfolk eating a banana.
- 13 S. African krantz.
- 14 Skeleton of a female baboon.
- 15 Leaves of the prickly pear showing the fruit which the Baboons feed.
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- 17 Yellow Baboon.
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- 20 Moholi Galago.
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- 22 Leopard at bay in thorny scrub.
- 23 A Hunting Leopard.
- 24 Skull of a Leopard.

- 25 A Serval Cat.
 - 26 A female Serval Cat.
 - 27 An adult Black-footed Cat.
 - 28 African Wild Cat and her Kittens.
 - 29 An adult Caracal and Kitten of the same species.
- FLYING MAMMALS.
- 30 A male Epauled Fruit Bat in the act of flying off with a fig.
 - 31 "Epauled" hanging from a branch.
 - 32 An "Epauled" Fruit Bat and its Baby.
 - 33 Yellow Fruit Bat.
 - 34 Collared Flying Fox with its baby.
 - 35 Skeleton of a Bat.
 - 36 Wing of a Bat.

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MAMMALS—LECTURE II.

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- 1 The Clivet Cat.
- 2 A Genet about to spring at a Lourie.
- 3 Large Spotted Genet.
- 4 Small Spotted Genet.
- 5 Small Grey Mongoose attacking a Rhingals Cobra.
- 6 Large Grey Mongoose.
- 7 Water Mongoose.
- 8 Pair of Water Mungooses and their little family.
- 9 Small Grey Mongoose.
- 10 White Tailed Mongoose.
- 11 Banded Mongoose.
- 12 Bushy Tailed or Rooi Meerkat.
- 13 Pair of slender Tailed Meerkats and their young ones.
- 14 A family of Aard Wolves.
- 15 Brown Hyaena.

- 16 Spotted Hyena.
- 17 A Black backed Jackal and one of a litter of five puppies.
- 18 A Black-backed Jackal emerging from cover.
- 19 Silver Fox.
- 20 Delalande's Fox.
- 21 Cape Hunting Dog or Wild Hondie.
- 22 Cape Hunting Dog on the watch for a meal.
- 23 Cape or Clawless Otter.
- 24 Two Spotted Neck Otters.
- 25 Honey Ratel.
- 26 Striped Muishond or Stink Cat and its family of three.
- 27 Snake Muishond.
- 28 Cape Sea Lion.
- 29 Young Sea Lions on rocks.

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- 5 Pair of Black Wildebeeste or White Tailed Gnu.
- 6 Blue Wildebeeste or Brindled Gnu.
- 7 Cape Duikers.
- 8 A Pair of Blue Duikers with fawn.
- 9 A pair of Klipspringers.
- 10 A Pair of Oribi.
- 11 Steehok Ram, Ewe and Fawn.
- 12 Gryshok, Ewe and Fawn.
- 13 Livingstone's Luni.
- 14 Waterhuck Bull.
- 15 A pair of Lechwe.
- 16 Puku.
- 17 Reedhuck, Ram and Ewe.
- 18 Vaal or Grey Rhebok, Ram, Ewe and Fawn.
- 19 Impala or Fallahm, Ram, Ewe and Fawn.
- 20 Springhuck, Ram and Ewe.

- 21 Pair of Roan Antelopes and Calf.
- 22 Sable Antelope.
- 23 Damaraland Dik-dik.
- 24 Young Gemsbok.
- 25 Bushbuk.
- 26 Inyala, Ram and Ewe.
- 27 Young specimen of Situtunga.
- 28 Young Kudus.
- 29 Hippopotamus.
- 30 A hoar Bush Pig.
- 31 Wart Hog Boar.
- 32 African Buffalo Calf.
- 33 Mountain Zebra.
- 34 Burchell's Zebra.
- 35 White or Square lipped Rhinoceros.
- 36 Black or Prehensile lipped Rhinoceros.
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- 39 African Elephant.

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 - 4 Musk Shrews searching for insects.
 - 5 The Golden Mole.
 - 6 The Golden Mole showing its picks and shovels (fore and hind feet).
 - 7 Dentition of an insectivorous animal (Golden Mole).
- RODENTS.
- 8 Dentition of a typical rodent animal (Porcupine).
 - 9 Grey footed Squirrel.

- 10 Red Headed Squirrel.
- 11 Grey Squirrel.
- 12 Cape Ground Squirrel.
- 13 Cape Dormouse.
- 14 Large Grey Dormouse.
- 15 Gerbille (Male and female).
- 16 Puff Adder in act of striking a Bush Otomys.
- 17 Vley Otomys.
- 18 Chestnut Tree Mouse.
- 19 Grav Tree Mouse.
- 20 Brown or Norway Rat.
- 21 White Nosed Rat.
- 22 Pouched Rat.

MAMMALS—LECTURE IV.—(Continued.)

- 23 Striped Rat.
 24 Cape Blesmol.
 25 Sand Mole.
 26 Mole Rat and Darling's Blesmol.
 27 Mounds or Hills cast up by the Blesmol.
 28 Springhare or Sprinthaas.
 29 Rock Rat.
 30 Cane Rat.
 31 South African Porcupine.
 32 (1) A white hollow quill from the tail of Porcupine.
 (2) Portion of a body quill showing the sharp end.
 (3) The same, showing the end which is loosely
 embedded in the skin.
 33 Tail of a Porcupine.
 34 Cape Hare.
 35 South African Hare.
 36 Red Hare.
 37 Rock Hare.
 38 School of Sperm Whales.
 39 Hump Back Whale.
 40 Hump Back Whale, showing baleen or whale
 bone in mouth.
 41 Sowerby's Beaked Whale.
 42 Elephant Seals.
 43 Aard Vark approaching a Termite Hill.
 44 Scaly Ant-Eater or Panaeolus.

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A N

THE NATURALIST IN AUSTRALIA

THE NATURALEIST IN AUSTRALIA
By W. SAVILLE-KENT, F.L.S., F.Z.S., &c.

Published by Chapman & Hall, Henrietta Street, W.C.

Lantern Slides (from the original negatives) of the illustrations in the 1

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- Aborigines of King's Sound, Western Australia
 2 "Broome Belles," Native women of Roebuck Bay, Western Australia
 3 Raft and Natives of King's Sound, Western Australia
 4 Ditto
 5 Glass and Quartz spear heads of Western Australia Aborigines
 6 Carved Baobab nut and shell aprons, with human hair girdles, Kimberley District, Western Australia
 7 Natives of Kimberley District, Western Australia, showing attitude assumed when holding and throwing the Boomerang
 8 Festal dance or "Corroboree" of Kimberley, Western Australia Natives
 9 Duck-billed Platypus, *Ostrichorhynchus paradoxa*
 10 Echidna or Spiny Ant-eater, Tasmanian variety, *Echidna setosa*
 11 Short-headed Flying Phalanger, *Petaurus breviceps*, showing position maintained during its characteristic flying leap
 12 White Individual of Large Flying Phalanger, *Petaurodes volans*, with tail pendulous
 13 White Individual of Large Flying Phalanger, (*Petaurodes volans*), with tail in its characteristic spirally enrolled state
 14 Australian Bear or Koala with cub. *Phascolarctos cinereus*

15 " " " in tree
 16 " " " asleep
 17 Flying Phalanger, *Petaurodes volans*
 18 Australian Ponched Mole, *Notoryctes typhlops*, ventral and lateral aspects
 19 Min-r's tent, and nest mound of Australian Jungle Fowl, *Megapodium turnicus*, Goode Island, Torres Straits
 20 Baobab or Bottle Tree, *Adansonia rupestris*, N.W. Australia
 21 Hollow wooden cradle used by the native women of the Kimberley District, Western Australia

Birds.

22 "Dulce Domum"
 23 Australian "More-porks" or fern owls. *Podargus strigoides*

24 Australian "More-porks," or fern owl, *Podargus strigoides*, illustrating remarkable disparity in size and aspect of Podargi under contrasting emotional influences
 25 Australian "More-pork" (male bird). *Podargus strigoides*
 Australian "More-porks," illustrating Protean aspects assumed under varying emotional influences : -
 26 Counting their Chickens
 27 Sportive excitement
 28 Calm repose
 29 Youthful innocence
 30 Terror and defiance combined
 31 Mimetic concealment
 32 Attenuated attitudes in imitation of the branches on which they sit
 33 In the Land of Nod - Fast asleep
 34 Australian More-pork nest building extraordinary
 35 Gouldian Finches dancing, (1) Introductory salutations, (2) *The Pas de Deux*
 36 North Queensland Laughing Jackass, *Dacelo leucotis*
 37 "Innocents Abroad," Young Australian Pelicans, *Pelecanus conspicillatus*
 38 Young Australian Osprey, *Pandion leucocephalus*

Lizards.

39 Frilled lizards at bay
 40 " " " at rest
 41 Frilled lizard, *Chlamydosaurus Kingii*
 42 Bipedal running phase; from instantaneous photographs
 43 Ditto
 44 Ditto
 45 Ditto
 46 Ditto
 47 Ditto
 48 Frilled lizards asleep
 49 Prototype of Chinese dragon
 50 Bearded lizard, *Amphibolurus barbatus*
 51 " " "

THE NATURALIST IN AUSTRALIA—Continued.

- 52 Australian Spinous Lizards, *Moloch horridus*, (male)
 53 " " " " (female)
 54 " " " " " A Way-
 side Greeting"
 55 like neck excrencences showing knapsack-
 56 Moloch or Spinous Lizards feeding at an ant track
 57 " A post-prandial promenade"
 58 (a) Skink 1 ft. 10 in. in diameter; (b) tail-sheath
 of Melanura Oweni
 59 A millinery novelty, or "Where did you get that
 hat?"
 60 Stump-tailed Lizards. *Tlachysaurus rugosus*
 61 Spine-tailed Lizards. *Egernia depressa* and *E.
 Stokesii*
 62 Australian Monitor or Lace Lizard. *Varanus
 varius*

Termites (White Ants.)

- 63 Nest mound of white ants (*Termites*) Meridian variety, Laura Valley, North Queensland
 64 Termite mounds, Albany Pass, North Queensland
 65 Figs. 1-7 Workers, soldier, nymphs, winged male and mature female of the European white ant, *Termita lucifugus*. Fig. 8, Gravid Queen of *Termita bellicosus*. Figs. 9-13 modifications of heads and jaws of soldier individual of various species
 66 Wood-devouring white ants, *Termita* sp., of the Kimberley district, Western Australia at † two soldier individuals
 67 (a) Nest mound of White Ants, Kimberley type, Derby, Western Australia
 68 (b) Ditto
 69 Ditto
 70 Ditto, (a) fullest development
 71 Ditto, (b) section
 72 Termite nests, Albany Pass, North Queensland
 73 Ant-Hill Point, Albany Pass, North Queensland
 74 (a) Nest-mounds of white ants, Kimberley type, abnormal shapes
 75 (b) Ditte
 76 (c) Ditto, phase of reconstruction
 77 (a) Ditto "
 78 Broadside view of Laura Valley, Meridian Ants' nest
 79 Nest mounds of white ants, Meridian variety, Laura Valley, North Queensland; end on view
 80 Nest mound of white ants, Meridian variety, Port Darwin, Northern Territory of South Australia; broad-side view
 81 Nest mound of white ants, Meridian variety, Port Darwin, Northern Territory of South Australia; end on view
 82 Termite mound, Port Darwin, Columnar type
 83 Ovate termite mound, with nest burrow of *Tanysiptera Sylvia*
 84 Small extra-tropical termite mound, with nest burrow of *Pase. hirsutus* *schlechterinus*
 85 *Trichomyrmex Leidyi*, S.K. infusorial parasites of the Tasmanian white ant exhibiting diverse protean modifications

Houtman's Abrelhos.

- 86 Wreck Point, Pelsart Island
 87 Mirage-elevated breakers on outer barrier, Pel-
 sart Island
 88 (1) Abrolhos corals. Genus *Madrepora*
 89 (b) " " " *Mon. pora* " *circinata*
 90 " " " *Madrepora corymbosa*
 91 " " " *Madrepora protiformis*
 92 " " " *Madrepora*
 93 " " " *Madrepora*
 94 stag's horn coral growth, *Madrepora hæbes*, Great
 Barrier Reef, Queens and
 95 Madrepora Branchlet, showing re-growth at
 broken end marked A
 96 Pelsart Island scroll coral. *Montipora circinata*
 97 The birth of a coral island, Abrolhos Archi-
 pelago, Western Australia
 98 Shell and Coral Beaches. Pelsart Island, Hout-
 man's Abrolhos
 99 Ditto
 100 Abrolhos Coral. *Madrepora prolif. ramosa*

Fishes

- 101 Plumbed Trevally. *Caranx gallus*
 102 Diamond Trevally
 103 Western Australian Snapper. " *Pagrus major*
 104 Plaster-casts of Tasmanian Fishes
 105 Seven-rayed Tassel Fish, *Polytmus verkeri*,
 Orl River, Cambridge Gulf, Western Australia
 106 Bottle-nosed Snapper. *Pagrus major*
 107 King Snapper or "Dannegeai". *Beryx Muller*
 108 Sea Pike. *Sphyraena obtusata*
 109 Sergeant Baker. *Aulopus purpurissatus*
 110 W. A. Jew-fish. *Glaucostoma brachium*
 111 Cat-fish Eel. *Motossus sp.*
 112 Lung-fish. *Ceratodus Forsteri*
 113 York Peninsula Barramundi. *Osteoglossum*
 Jardinei
 114 Murray Cod. *Oligorus macquariensis*
 115 Tasmanian Toadfish. *Tetronotus Hamiltoni*
 116 Port Jackson Shark. *Cestracion Phillipsi*

Pearls and Pearl Oysters.

- 117 Western Australia Pearls
 118 Pearl-luggers in Broome Creek, Roebuck Bay, Western Australia
 119 The Western Australia "Southern Cross" Pearl
 120 Remarkable Western Australian Pearl
 "*L'Escarpe Prudge*"
 121 The "Southern Cross" Pearl
 122 Pearl Oyster, with pearl-embedded fish, contained in the British Museum collection
 123 Pearl Oyster laid open, showing at A double pearl, and at B small commensal crab
 124 Experimental pearl-shell cultivation sites, coral reef, Thursday Island
 125 Experimental pearl-shell cultivation sites, Mangrove Thicket, Roebuck Bay
 126 Young tropical pearl oysters attached to a portion of the parent shell, grown in Shark's Bay, Western Australia
 127 Natural clusters of Shark's Bay Mother-o'-Pearl shell, *Meleagrina imbricata*
 128 (a) Pearl-shelling Station, Fresh Water Camp, Shark's Bay, Western Australia
 129 (b) Pearl-shelling Station, Fresh Water Camp, Shark's Bay, Western Australia
 130 Shark's Bay Golden Pearls
 131 Artificially produced Pearl
 132 Western Australian Pearls

Marine Miscellanea.

- 133 "Rhinoceceres Rock," Roehuck Bay, Western Australia
 134 Ascidian-covered Rocks, Roehuck Bay, Western Australia
 135 Social Holothurians, *Celochirus anceps*, Roehuck Bay, Western Australia
 136 Cygnet Bay Sea Anemones. *Condylactis* sp.
 137 Giant Sea Anemone *Dioctamia Haddoni*, with Commensal fish and crab
 138 Bladder-tentacled Anemones. *Physobrachia* sp.
 139 Stinging Anemones. *Actinodendron aculeatum*
 140 Socially consorted Anemones and worm tubes. *Aeroacanthus Australis*
 141 Living coral, *Destropylegia crifuga*, with polyps expanded
 142 Turbinaria Petiata, Shark's Bay. Western Australia
 143 Young cup corals, *Turbinaria conspicua* et *T. petiata*, Port Denison, Queensland
 144 Polaceous cup corals, *Turbinaria conspicua*, Shark's Bay, Western Australia
 145 Revolute cup coral, *Turbinaria revoluta*, Shark's Bay, Western Australia
 146 (a) Vericillitate stalked sponge. *Culopponia verticillata* (b) Neptune's cup sponge. *Petrosia pecten var.*
 147 Young turtles, *Chelone mydas*, photographed while swimming
 148 Jellyfish, *Disco medusa*, photographed in water from life
 149 Mangrove fighting crabs. *G. lassimus coarctata*
 150 Army crabs. *Myceria longicorpus*

THE NATURALIST IN AUSTRALIA—continued.

- 151 Army crabs, *Myceris platycheles*, "A desperate mèlée"
 152 Coralrock oysters, *Ostrea mordax*, Great Barrier Reef
 153 Rock oysters, *Ostrea glomerata*, Keppel Bay, Queensland
 154 Cornucopia-like variety of *Ostrea mordax* Keppel Bay, Queen-land
 155 The author's oyster culture apparatus
 156 Dwarf oysters, *Ostrea ordensis*, Ord River, Western Australia
 157 Stalactite-like rock concretions, Sween's Island, Gulf of Carpentaria, N. Queensland
 158 Queensland "X-ray" spider, *Argiope repalis*, with ribbon-strengthened web
 159 Queensland spider, *Nephila fusipes*; (a) diminutive males; (b) commensal spiders, Genus *Argyrodes*; (c) parasitic spiders
 160 Western Australian Tarantula, *Ixopoda* sp.
Vegetable Vagaries
 161 Western Australian Bottle Tree, "Sub tegmine Boahi"
 162 Flowers of Baobab tree, *Adansonia indecisiva*
 163 (1) Western Australia Baobab or Bottle Trees
 164 (2) " " "
 165 (3) " " "
 166 (4) " " "
 167 (5) " " "
 168 (6) " " "
 169 Baobab Tree, nut-bearing example, with double trunk

The following Slides, beautifully painted, are copied from the coloured plates in book, 10s. each.

- 189 Tidally-exposed inshore reef, Palm Island, Queensland
 190 Australian Gouldian Finches, *Poephila mirabilis* et *P. Gouldii*
 191 Australian Frilled Lizard, *Chlamydosaurus kingi*
 192 Madrepore Reef, Pelsart Island Lagoon, Houtman's Ahrolhos

- 170 Prostrate Baobab, with rejuvenescent trunks
 171 Lightning-shattered Baobab tree, near Derby, King's Sound, Western Australia
 172 Grass-trees, Cycads, and Ferns, Drakesbrook, Western Australia
 173 Arborescent grass-tree or "Blackboy," *Xanthorrhæa arborea*
 174 Underground grass-tree or "Blackboy," *Xanthorrhæa hastis*
 175 Drumstick grass-tree or "Blackboy," *Xanthorrhæa australis*
 176 Mangrove-frequenting fruit Bat, *Pteropus conspicillatus*
 177 Orange and White Mangroves, *Misophora mucronata* and *Avicennia officinalis*, Broom Creek, Western Australia
 178 Rosett-galls of white mangroves
 179 Bird Pen, Roebuck Bay, Western Australia
 180 *Sodicornia* sp., Cygnet Bay, Western Australia
 181 "Roley-Poley" grass, *Spartina longifolius*, Shark Bay, Western Australia
 182 Fringed Violet, *Thysanotus dichotoma*
 183 White Cactus, *Cereus nitens*
 184 " " " Chalybeus
 185 " " " Grandiflorus
 186 Australian Tree-ferns
 187 Trumpet creeper, *Bignonia grandiflora* on Queensland Verandah
 188 Water Hyacinth, *Pontederia crassipes*, Adelaide Botanic Gardens

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 51 Ostrich, running. 773.

BZ**VETERINARY SCIENCE.**

Slides selected and arranged by James Brodie Gresswell, F.R.C.V.S., Lecturer on Veterinary Science for the Lindsey and the Hollands County Councils of Lincolnshire; co author of "Equine Medicine"; author of "Veterinary Pharmacology and Therapeutics," etc., etc.

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Section i.—Veterinary Anatomy.

- 1 The Skeleton of the Horse
- 2 " Cow
- 3 " Sheep
- 4 " Dog
- 5 " Pig
- 6 Lateral view of the Horse Skull
- 7 Right fore-foot of a Horse
- 8 Left hind-foot of the Horse, External aspect
- 9 External Muscles of the right anterior limb of the Horse
- 10 The Larynx of the Horse, Cartilaginous pieces maintained in their natural position by the articular Ligaments, Superior and Inferior Faces
- 11 The Bronchial Tube of the Horse with its Bronchioles and ultimate ramifications
- 12 Kidneys of the Ox
- 13 Heart and principal Vessels of the Horse—Left Face
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- 15 Stomach of the Horse
- 16 Stomach of the Ox seen on its right upper face, the Abomasum being depressed
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- 19 Median and Vertical Section of the Horse's Brain
- 20 Nerves of the Digit

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- 29 A Specimen of the Glanders *Bacillus*

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- 57 Anterior Presentation: Lateral deviation of the head towards the shoulder
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VETERINARY SCIENCE—Continued.

- 76 Bones of Hind-legs.
 77 Bones of Fore-legs.
 78 Over-reach.
 79 Mallender.
 80 Sallender.
 81 Spavin and Spavin from outside.
 82 Curb.
 83 Capped Hocks.
 84 Quittor.
 85 Yorkshire Boot in course of fixing and complete.
 86 Hoof prepared for Charlie shoe.
 87 Laminitis-pointing.
 88 Seedy Toe.
 89 Lacing.
- 90 Bog spavin.
 91 Thoroughpin.
 92 Splint and Splint from outside.
 93 Knuckling over.
 94 Side bone and side bone from outside.
 95 Sand Crack.
 96 A Cankered Foot.
 97 Wind-galls.
 98 Brushing.
 99 Dibbing.
 100 Calf Knees.
 101 Forging.
 102 Ring bone and Ring bone bigb from outside.

BY DISEASES AND PARASITES OF CATTLE.

Many from original drawings by the late Professor Allen Harker, F.L.S.

Plain Photographs, 2s. each.

- 1 Warbles in Ox, *Hypoderma bovis*, female, Larva from tumour. Genital apparatus, eggs, &c.
 2 Dot in the Horse, *Gastrophilus equi*, Bits attached to stomach, eggs on hairs, and adult Fly
 3 Mange in the Horse, *Psoroptes communis equi*, male
 4 Mange in the Horse, male and female
 5 Mange in the Dog, *Demodex follicularum*
 6 Itch in Man, *Sarcopeta scabiei*, male and female
 7 Scab in Sheep, *Psoroptes longirostris var oris*
 8 Lice of Pig
 9 " of Horse
 10 " (sucking) of Ox, *Hematopinus erycterinus*
 11 " (biting), *Trichobaeus scalaris*, with allied form from Magpie for comparison
 12 Tick from Sheep, *Ixodes ricinus*
 13 Tick from Dog, *Ixodes ricinus*
 14 " or Ked from Sheep, *Melophagus ovinus*

- 15 Brain of Sheep with polycephalous Hydatid of *Tenia conura*
 16 A Tape Worm of Dog, *Taenia marginata*, in Bladder Cyst from Sheep
 17 Tape Worm of Dog, *Taenia marginata*
 18 *Trichina spiralis* a piece of infested flesh
 19 Liver Fluke of Sheep, *Distomum hepaticum*
 20 The Snail, the Fluke inhabitant, *Limnaea truncatula* and embryo of *D. Lepatum*
 21 Autumn Breeze Fly, *Tabanus horvii*, magnified head and mouth organs
 22 Common Symbiot, *Symbiotus communis*, found on Horse, Ox, Goat, Sheep, and Rabbit
 23 Tape Worm of a dog Detail
 24 Egg of Liver Egg of Fluke, etc
 25 Fully developed Radia
 26 Section of Sheep's head

FARM LIVE STOCK.

Beautifully Painted, 6s.; Plain Photographs, 2s. each.

This Series has been arranged by J. H. Dugdale, Esq., of Warwickshire, with the kind co-operation of Professor Wallace, of Edinburgh, and of several eminent Breeders, who have kindly permitted the use of their photographs of Stock.

Text Book, "Farm Live Stock of Great Britain," by Robert Wallace, F.L.S., F.R.S.E., &c., Prof. of Agricultural and Rural Economy in the University of Edinburgh.

Published by Messrs. Crosby Lockwood & Sons, 7, Stationers' Hall Court, price 30s.

BU

HORSES.

- 1 Cleveland Bay Horse "Fidius Deus," R. V. Webster, Esq.
 2 Clydesdale Stallion "Prince of Carrughan," Peter Crawford, Esq.
 3 " " " Darnley," David Riddell, Esq.
 4 " " " Prince of Wales," 678
 5 " " " Prince of Albion," 6178
 6 " Mare, "Moss Rose," John Gilmour, Esq.
 7 Cossingham Stallion, "Salisbury," Thos. Carr, Esq.
 8 " Mare, "Wasell Belle," T. B. Church,
 9 Hackney or Norfolk Trotter in harness (Esq.)
 10 Shire Stallion, "Spark," The Duke of Westmorland
 11 " " " Hitchin Conqueror," A. B. Freeman Milford, Esq., C.B., M.P.
 12 " " " Stanton Hero," W. Gilhey, Esq.
- 13 Shire Mare, "Chancie," A. B. Freeman Milford, Esq.
 14 " " " Lexington Beauty" and Foal
 15 Shetland Pony Stallion, "Laird of Noss," 20, The Marquis of Londonderry
 16 Suffolk Punch Stallion, "Wedgwood," A. J. Smith, Esq.
 17 Suffolk Punch Mare, "Queen of Trumps," 270
 18 Poston Mule, "Beauty," 17 bands, P. C. Sutherland, Esq.
 19 Jack Donkey, "Malta Jack," C. L. Sutherland, Esq.
 20 Trotting Horse (American), "Allerton" 2-12
 21 " Mare, "Sunol" 2-34
 22 Thoroughbred Horse, "Foxhall"
 23 A Hayfield in Gloucestershire
 24 "Simon Dale," Duke of Portland

- 25 Cleveland Bay
 26 Clydesdale Horse
 27 " "
 28 " "

- " Ardendale"
 " Gallant Stewart"
 " Dunure Realisation"

FARM LIVE STOCK—HORSES—continued.

32 Clydesdale Horse.	40 Hunter thoroughbred Mare
33 " Mare " Dunure Myrene "	41 Suffolk Punch Stallion " Morston Old Guard "
34 " Filly " " "	42 " Horse "
35 " Colt " Passchendale "	43 " Shire Horse " Tatton Wray King "
36 " Horse " Dunure Footprint "	44 Welsh Pony
37 " Eaton Fenland King "	45 "
38 Hackney Horse	46 A Thoroughbred Race-horse " Papyrus "
	47 Thoroughbred Race-horses in action

B V

- 1 Black-faced Scotch Mountain Ram, "Chenester's Grandson," Charles Howatson, Esq.
 2 Black-faced Scotch Ram "Potiphar," Archibald, Black-faced Scotch Ewes, John Craig, Esq. [Esq.
 3 Border Leicester Ewes
 4 Border Leicester Lambs
 5 Cheviot Ram J. A. Johnstone, Esq.
 6 Cheviot Ram "Aruna Sandy" (East County Variety), John Elliot, Esq.
 8 Cheviot Ewe (West County Variety), J. A. Johnstone, Esq.
 10 Cotswold Ram, Russell Swanwick, Esq.
 12 " Ewe (Two-horn), Russell Swanwick, Esq.
 13 Devon Long-wool two-shear Ram, Sir J. H. H. Amory, Bart.
 14 Devon Long-wool Ewes, Sir J. H. H. Amory, Bart
 15 Dorset Horned Flock, H. Davis, Esq.
 17 Exmoor Ram, Sir Wm. R. Williams, Bart.

SHEEP.

- 18 Exmoor Ewe, Sir Wm. R. Williams, Bart.
 19 Hampshire Down Ram, Robert Coles, Esq.
 20 " Rams, College of Agriculture, Downton
 21 Herdwick Ram, "Disraeli" and Ewes
 22 " Sheep
 23 Kent or Romney Marsh Ram, in full fleece, H. Page, Esq.
 24 Leicester Ram, T. H. Hutchinson, Esq.
 25 " Ewes,
 26 Leicester Sheep in Wool
 27 Lincoln Sheep in Wool, H. Dudding, Esq.
 29 " Rams
 30 " Ewe, Robert Wright, Esq.
 31 " Ewe with Lambs
 32 Lorn Ram (Two-shear), "Captain," Mrs. Dawson
 33 " Ewes (Two-shears), Mrs. Dawson
 34 Merino Rams (Two young, Pure Stud)

- 35 Merino and Scottish Black-faced Mountain Crosses
 36 Oxford Down Rams, C. Hobbs, Esq.
 37 " Ram, " Liverpool Freeland," John Treadwell, Esq.
 38 Oxford Down Ewe
 39 Roscommon Ram, Richard Flynn, Esq.
 40 Ryeland Ram Frank Shepherd, Esq.
 41 Shropshire Ram, "Webton Prince," Edward Caddick, Esq.
 12 Shropshire Ewes, Edward Caddick, Esq.

- 43 Somerset and Dorset Horned Sheep
 44 Southdown Ram, "No. 24"
 45 Suffolk Ram, "Sailor Prince," Edward Gittins, Esq.
 46 " Ewes, Joseph Smith, Esq.
 47 Welsh Mountain Ram
 48 " Ram and Ewe
 49 Wensleydale Ewe
 50 " Ram (Shearing)
 51 Wolsley Shearing Machine at Work in Wool Shed.
 52 Shearing Scotch Black-faced Mountain Sheep.

- 53 Border Leicester Sheep
 54 " " Royal Wallace "
 55 " " His Majesty "
 56 Cheviot Sheep Three specimens
 57 " Group
 58 " Shearing, the old way
 59 Corriedale Wool
 60 Dorset Horn
 61 English Leicester Royal Winner
 62 " Prize Sheep
 63 Garton Park Flock
 64 Lincoln Sheep
 65 Merino Ram
 66 Romney Marsh World's Champion Ram
 67 " Group

- 68 Romney Marsh Single Westbrook
 69 " Ewes with their 150 Lambs
 70 Suffolk Ram
 71 Suffolk Ram
 72 " Carcase
 73 Southdown Nottingham Champion
 74 " Sir Jeremiah Colman's
 75 " Group
 76 Three Shropshire Rams
 77 Shropshire Down
 78 Sheep Cross Breeding
 79 Group of Suffolk Ewes in full fleece, 17 mths. old
 80 Typical "
 81 Foraging "

B W

CATTLE.

- 1 Anglesea or North Wales Black Bull, Major Sandbach
 2 Anglesea or North Wales Black Cow, Col. Platt
 3 Ayrshire Bull (Cook a Bendie) J. Osborne, Esq.
 4 " " " Craig of Kyle "
 5 " Cow, " Bertie II. of Clockstone," Sir Mark J. Stewart, M.P.
 6 Ayrshire Heifer, "Nellie of Barcheskies"
 7 Castle Martin of South Wales Black Bull "Zulu," H. B. 129, Earl of Caador
 8 Castle Martin or South Wales Black Cow "Leona I." H.B., 245, Earl of Caador
 9 Castle Martin or South Wales White Bull with Black Points
 10 Dexter Kerry Bull, "Paradox," Martin J. Sutton, Esq.
 11 Dexter Kerry Cow "Rosemary," Martin J. Sutton, Esq.
 12 Galloway Bull, "Camp Folower" (5042) James

- 13 Galloway Heifer, "Tidy 5th of Drumlanrig," Leonard Pinington, Esq.
 14 Glamorgan Bull J. T. Davys, Esq.
 15 Guernsey Bull, "Climax," The Express Dairy Company, E.G.H.B., 14.
 16 Guernsey Cow, "Ladybird II.," Express Dairy Company, H.B. 388
 17 Hereford Bull, "Rare Sovereign," Lord Coventry
 18 " Heifer " "Primrose," Edward Caddick, Esq.
 19 Hereford Cow "Mrs. Belle," Her Majesty the Queen
 20 Jersey Bull "Distinctions Pride," Jas. Blatch, Esq.
 21 " Cow, " Pontorson," Lord Rothschild
 22 " Cow, A. E. McMullen, Esq.
 23 Kerry Bull, "Paddy Blane," Lord Clonwell
 24 " Cow, " Flora," Martin J. Sutton, Esq.
 25 Longhorn Bull, "Inke of Buckingham"
 26 " Cow, Duke of Buccleuch
 27 Norfolk and Suffolk Red Poll Bull, "Diddlington Davison II." Lord Anerst

FARM LIVE STOCK—(Continued.)

- 28 Norfolk and Suffolk Red Poll Cow, "Emblem
Lord Amherst."
 29 Norfolk and Suffolk Red Poll Cow, J. J. Colman
Esq., M.P.
 30 Norfolk White Polled Cow, "Blickling Jenny"
 31 " " " Tom "
 32 North Devon Bull, "Lord Woiseley," H.B. 2063,
Lord Falmouth
 33 North Devon Heifer, "Flower II," H.B., 9335,
Sir W. Williams
 34 North Devon Cow, "Fairmald," 9837, D.D., H.B.
Sir W. R. Williams, Bart.
 35 Polled Aberdeen Angus Cow, "Waterside Matilda
II," George Wilkes, Esq., H.B., 6312
 36 Polled Aberdeen Angus Bull, "Cash"
 37 Shorthorn Bull (Bates), Cow, "Duchess of Leic-
ester II."
 38 " " (Scottish) Bull, "Mario"
 39 " " Barrington," Duke of North-
umberland.
 40 Shorthorn Cow
 41 " Heifer, "Fairy Rosebud"
 42 " " Bracelet"
 43 Shetland Cattle.
 44 Sussex Cow, "Elsa."
 45 Sussex Ox, W. S. Forster, Esq.
 46 " Bull, "Gondolier," W. S. Forster, Esq.
 47 West Highland Bull, "Seumas A'Ghlinne," H.B.
482, Earl of Southesk.
 48 West Highland Heifer, "Lady Flora," Earl of
Southesk.
 49 White Polled Cattle, Somerford Park, Sir C. W.
Shakerley, Bart., C.B.
 50 Wild White Cattle, Cadzow Forest, Hamilton
 51 " " Chartley Park
 52 " " Vaynol Park, Bangor
 53 Skull and Horn Cores of the Bos urus or Primi-
genius—width below horns, 12 in.; length of
horn cores, 27 in.
 54 Ayrshire Cow "Spaniel Bag Winnie."
 55 " Tors Misil."
 56 " Bull, "Chapehill Fearnought."
 57 " " Rising star."
 58 " " Look Alive."
 59 " " Nether Craig."

- 60 Champion Milking Cow, "Jehanna Tehu."
 61 Devon Steer.
 62 " Fat, 19½ cwt.
 63 " Bull.
 64 " Old and New Type.
 65 Dairy Shorthorn.
 66 Dexter Kerry Cow, "La Mancha."
 67 Hereford Bull, "Rob Roy."
 68 Hedges Bull, "Fokke 2nd."
 69 Highland Cow, "Madam Luna" with Calf.
 70 Holstein Cow, "Waltham Plum."
 71 " " " Garton Comfort."
 72 " " " Betsey Grey."
 73 " " " Colton Princess Mary."
 74 " " " Fokke II."
 75 " " " Froakje III."
 76 " " " Park Buttercup."
 77 Holstein " Shewing Udder from rear.
 78 Irish Dairy Shorthorns.
 79 " Jersey Bull " Inspector."
 80 " Cow.
 82 " Cattle.
 83 Kerry Cow, "Walton Bashful."
 84 Shorthorn Bull, "Thornby Don."
 85 " Cow, "Countess of Hegg 2nd."
 86 " " " Hero Fancy."
 87 " " " Playful Marigold."
 88 " " " Lady Florence II."
 89 " Ormerod Butterfly Prince."
 90 Two year old Steer, "Pan of the Burn."
 92 Three year old Cow, "Euroto."
 93 " Bull, "Prince Blue Blood of
Ballindalloch."
 94 Two year old Heifer, "Benton Bride."
 95 " Monkhill Butterfly."
 96 " One Royal."
 97 " Oyster Princess."
 98 " Oyster Queen."
 99 " Resolute."
 100 Bull Calf "Ewyford Ringer."
 101 Ringer sold for £9,450.
 102 Heredity—Cow Testing Irish Department

For Slides on "Tanning," see Industries, Section 7 of this Catalogue.

BX

PIGS.

- 1 Berkshire Boar, J. H. Dugdale, Esq.
 2 " Sow.
 3 Yorkshire Boar (large white), "Holywell Windsor."
 4 " (middle white), "Holywell Billy"

- 5 Yorkshire Sow (small white), Saunders Spencer.
 6 Suffolk, or small black Pigs [Keg.
 7 Tamworth Pigs
 8 Prize Pigs for Bacon purposes

- 9 Berkshire Boar.
 10 Large Black or Devon Sow.
 11 Large Black Boar.

- 12 Large White Pig.
 13 Middle White or Yorkshire Pig.

BYT

OUR FARMYARD FRIENDS.

From Negatives by DOUGLAS ENGLISH, B.A., F.R.P.S.

This series has been specially taken by Captain ENGLISH for lecture purposes in connection with his two recent books, "Our Farmyard Friends," published by Bell, and "Friends of Mankind," a more advanced book, published by Duttons of New York. They are therefore illustrative of the "habits" of our familiar farm animals and birds, rather than of their "points."

Coloured Slides, 6s. 6d. Plain Slides, 2s. 6d. each.

PIGS.

- 1 Large Black Sow, full face, showing nose-ring.
 2 Litter of young pigs, showing the weanling.
 3 Sow looking over gate of sty. Front.
 4 " Side.
 5 Young " playing with pig-pail.
 6 Young pig squealing under gate.
 7 Sow snarling.
 8 Sow and gander.
 9 Young Pigs and gander.
 10 Sow and family on the road.
 11 Terrier barking at Sow and family.
 12 " sitting with same.
 13 " with young pigs.
 14 Sow and family at grass.

- 19 Turkeys preening their feathers.
 20 Turkey Cock feeding.
 21 " " gobbling.
 22 " " displaying. Tail-spread.
 23 " " head and Neck. Close-up.
 24 " " and Cock flapping its wings.
 25 " " and Guinea Fowl.
 26 Guinea Fowl. Side.
 27 " " on window ledge.
 28 Procession of Guinea Fowls.
 29 Cock crowing. Front.
 30 " " Side.
 31 " " Three-quarter.
 32 Hen taking sand-bath.

OUR FARMYARD FRIENDS—(Continued.)

- 33 Hen drinking.
 34 " and Chicks.
 35 Chickens scurrying.
 36 Foster Mother Hen with ducklings afloat.
 37 " " ashore.
 38 A Meditative Fowl.
 45 Girl nursing pet duck.
 46 Duck and Drake out walking.
 47 Duck quacking.
 48 Group of Ducks on water.
 49 Duck flapping wings.
 50 Ducks in procession.
 51 Ducks resting in farmyard.
 52 Geese scurrying to water.
 53 " on river bank.
 54 " swimming in river.
 55 " and goslings swimming.
 56 Goose flapping wings.
 57 " issing at terrier from nest-box.
 58 Geese driving off terrier.
 59 " entering pond.
 60 " hissing at terrier.
 61 Gander at the pig-trough.

"CATTLE"—HORSES AND DONKEYS.

- 66 Cow nibbling its companion's ear.
 67 Calf scratching its neck with its foot.
 68 Pair of White Heifers in show.
 69 Group of Short Horns.
 70 Kerries waiting to be milked.
 71 Short Horn going into milking shed.
 72 White Heifer browsing on hedge-row.
 73 Cows leaving farmyard.
 74 " in the byre.
 75
 76 Cart Horse rising from the ground.
 77 Horse lying on the ground.
 78 Cart Horse and Foal. Front.
 79 " " Side.
 80 Horse and Donkey.
 81 Horses returning from water.
 82 Horses waiting to be stabled.
 83 Foal rolling.
 84 Donkey's head. Close-up.

SHEEP AND GOATS.

- 86 Sheep washing.
 87 " Shearing by hand.
 88 A Lamb gone astray.
 89 Bottle Lamb and Terrier.
 90 Sheep and Terrier.

- 91 Ewe and Twin Lambs.
 92 Lamb butting stone.
 93 The lost Lamb.
 94 Pair of Lambs (horned breed).
 95 Sheep on Sussex Downs.
 96 Shepherd watching Sheep.
 97 Sheep Dog behind flock on road.
 98 Shepherd leading sheep to food trough.
 99
 100 Lambs playing.
 101 Lambs in snow.
 102 Sheep with Lambs in snow.
 103 A herd of goats.
 104 Goat shaking hands with his mistress.
 105 Kids resting.
 106 Kids butting each other.
 107 Kid jumping.
 107a Goat and Kids.

CATS AND DOGS.

- 108 Kitten in work-basket. Front.
 109 " " Three-quarter.
 110 Kittens " under Haystack.
 111 Manx Cat. Tail-less.
 112 Manx Cat, showing length of hind leg.
 113 Kitten Race.
 114 Kittens playing.
 115 Group of four Kittens.
 116 Kitten on stair-case.
 117 Kitten looking up.
 118 Kitten climbing tree.
 119 Kittens under tree.
 120 Cat taking Kittens for walk.
 121 Kittens and bob-tailed Sheep-dog.
 122 " " " " Kitten stretching itself.
 123 A Stray Cat.
 124 The White Cat.
 125 Cat carrying Kitten.
 126 Cat and Dog playing.
 127 Kittens playing with scraper.
 127a Kittens and toad.
 128 A twenty year old Cat.
 129 Head of Persian Cat.
 130 The Watch Dog.
 131 Head of Bull Dog.
 132 Terrier Pup.
 133 A Terrier Family.
 134 Farm Dog watching gate.
 135 St. Bernard Dog.
 136 Bob-tailed Sheep Dog gnawing bone.

RM LIVE STOCK FROM THE ROYAL FARMS AT WINDSOR.

The following Slides of Pedigree Cattle are all made from negatives taken at the Royal Farms at Windsor.

Beautifully Painted 6s.; Plain Slides, 2s. each.

- 1 Devon Steer.
 2 Devonshire Heifer.
 3 Devon Heifer.
 4 Shorthorn Hereford Steer.
 5 Young Hereford Bull.
 6 Hereford Bull.
 7 Hereford Steer.
 8 Shorthorn Hereford Steer.
 9 Hereford Bullock.
 10 Hereford Co.
 11 Lincoln Red Shorthorn Steer.
 12 Young Sussex Bull.
 13 Young Sussex Bull.
 14 Black North Wales Bull.
 15 Black North Wales Steer.
 16 Welsh White Bullock.

- 17 Shorthorn Bull.
 18 Shorthorn Heifer.
 19 Shorthorn Bull.
 20 Shorthorn Steer.
 21 Shorthorn Bullock.
 22 Shorthorn Heifer.
 23 Longhorn Bull.
 24 Shorthorn Heifer.
 25 Large Horned Goat.
 26 Asiatic Ass and Foal.
 27 Asiatic Ass and Shetland Ponies with Foals.
 28 Shetland Pony with Foal.
 29 Shetland Pony with Foal.
 30 Berkshire Sow and Pigs.
 31 Berkshire Sow.
 32 Three Black Essex Pigs.

B T**SCENES IN AND AROUND A TYPICAL FARM.**

Beautifully Painted 5s. 6d and 6s. each; Plain Slides, 2s. each, except where otherwise marked.

- 1 A typical Farm and Building.
- 2 A typical Farm, showing House.
- 3 The Farmyard. Cattle returning.
- 4 Hen and Ducklings in water.
- 5 Geese.
- 6 Collie dog. "On guard."
- 7 Cat and Kittens.
- 8 Fox Terrier and Cat.
- 9 Farm Horse and Cart.
- 10 Mare and Foal.
- 11 Shire Mare.
- 12 Horse's Head. (Saddle).
- 13 Horse's Head. (Draught).
- 14 Horse's Head. A study looking out of stable. 2s. 6d.
- 15 Three Mares and Foal.
- 16 Watering Horses.
- 17 Washing Cars.
- 18 Donkey and Foal.
- 19 Shetland Ponies.
- 20 Sheep and Lambs.
- 21 Ewe and two Lambs.
- 22 Sheep and Lambs by the stream.
- 23 "Mary had a little lamb."
- 24 Cattle chewing the cud.
- 25 Maid milking a Cow.
- 26 A Dairy Cow.
- 27 Shorthorn Bull.
- 28 Shorthorn Heifer.
- 29 Farmyard Friends. Highland Bull with child on back.
- 30 Berkshire Boar.
- 31 Pigs, young and mother. A Study in Black and White. 2s. 6d.
- 32 Bullock harrowing.
- 33 Horses, two, ploughing.
- 34 Horse and Ox ploughing.
- 35 In 'the Stack yard.
- 36 Field Mouse, nest and young. 2s. 6d.
- 37 Fox Terrier and Rat.
- 38 Skye Terrier and Hedgehog.
- 39 Fox Terrier.
- 40 Three Scots Terriers.
- 41 Retriever. Head Study. 2s. 6d.
- 42 Setters and Pointers.
- 43 The Sleeping Beauty. (Bull Dog).
- 44 St. Bernard Dog.
- 45 Dogs, young Lupetti. 2s. 6d.
- 46 Two Deerhounds.
- 47 Four Esquimaux Pups.
- 48 Three Greyhounds.
- 49 Mastiff.
- 50 Pug Dog.
- 51 Bull Terrier.
- 52 Dachshund.
- 53 Retriever drinking at Fountain with child.
- 54 Stag and two Hinds.
- 55 Wild Fox leaving fox earth. 2s. 6d.
- 56 Fox at Rabbit Hole.
- 57 Rabbits, young. 2s. 6d.
- 58 "The Hoy Express." (Bullock Cart).
- 59 Trapping Birds in Winter.
- 60 At the Smithy.
- 61 "The Meet." 2s. 6d.
- 62 The Hounds at the Kennel. 2s. 6d.
- 63 The Hounds out for exercise. 2s. 6d.

A O E COUNTRY LIFE AND AGRICULTURAL SCENES.

Beautifully Painted 6s.; Plain Slides, 2s. each.

- 1 Ploughing, with three horses.
- 2 Haymaking. Cutting the grass with Horse Mower.
- 3 " Tossing into Haycock.
- 4 " A Horse Haymaker.
- 5 " Trimming up ready for carting.
- 6 " Loading.
- 7 " Raking by Horse Machine.
- 8 " Stacking the hay by elevator.
- 9 " A Rick Yard.
- 10 Reaping Corn with Scythe.
- 11 Reaping with sickles, and binding by hand.
- 12 Reaping with a Self-binding Machine.
- 13 A Field of Wheat, Stacked.
- 13a A Stack of Wheat.
- 14 Building a Hay-stack by an elevator.
- 15 Building a Hay-stack, by an elevator, nearer view.
- 16 A Sprig of Oak, with Oak-apples.
- 17 Mistletoe growing on a tree-trunk.
- 18 Sheep-shearing, Washing wool in trough.
- 19 Sheep-shearing (I.).
- 20 Sheep-shearing (II.).
- 21 A Business Street in a Country Village.
- 22 A Market in a Country Village.
- 23 A Typical Country Inn.
- 24 A Shoeing Forge.
- 25 A Field of Waving Corn.
- 26 A Reaping Machine at Work.
- 27 Milking Time.
- 28 A Kentish Hop-garden, general view.
- 29 A Kentish Hop-garden in Cranbrook.
- 30 A Cattle Drinking. A typical River Scene.
- 31 A Donkey Ride.
- 32 Nest box in Tree.
- 33 A Rookery in a Public Park.
- 34 A Pound.
- 35 A Stack of Wheat.
- 36 Apple Tree in Blossom.
- 37 A Row of Poplars.
- 38 An Oak Tree in Winter.
- 39 Elm Tree in Winter.
- 40 Elm Tree in Summer.
- 41 Chestnut Tree in Winter.
- 42 Chestnut Tree in Bloom.
- 43 Sweet Chestnut. Bud and Leaf.
- 44 " " " " " showing four stages of opening.
- 45 " " " " " "

For sets on Typical English Scenery Studies,

See sets **U F**, and **A G O** Geography, Section 5 of this Catalogue.

B R**ELEMENTS OF AGRICULTURE.**

This series of Slides is prepared under the authority of the Royal Agricultural Society of England, from negatives specially provided by the Society.

Text Book by W. Fream, Esq., LL.D. Coloured Slides, 6s. Plain Slides 2s. each

- | | | |
|-----------------------|---------------------------|---------------------------------|
| 1 Shorthorn Bull | 12 Ayrshire Cow | 23 Southdown Shearling Ewe |
| 2 " Cow | 13 Jersey Bull | 24 Shropshire Two Shear Ram |
| 3 Herford Bull | 14 " Cow | 25 Hampshire Down Two Shear Ram |
| 4 Devon Cow | 15 Guernsey Cow | 26 Suffolk Shearling Ewe |
| 5 Sussex Bull | 16 Kerry Cow | 27 Galloway Ram |
| 6 Welsh Bull | 17 Dexter Kerry Bull | 28 Lassie-fac'd Mountain Ewe |
| 7 Longhorn Cow | 18 Leicester Two-horn Ram | 29 Large White Sow |
| 8 Red Poll'd Bull | 19 Border Leicester Ram | 30 Small |
| 9 Aberdeen-Angus Bull | 20 Cotswold Ram | 31 Berkshire Boar |
| 10 Galloway Cow | 21 Lincoln Shearling Ewe | 32 Tamworth Sow |
| 11 Highland Bull | 22 Oxford Down " | |

B S**FARM IMPLEMENTS.***Beautifully Painted, 6s. Plain Photographs, 2s. each.***EARLY TYPES.**

- 1 Chilli breast Plough, by Ransomes
- 2 Parts of a Plough "
- 3 Ploughing "
- 4 Drill
- 5 Steam Digger, Darby's
- 6 " Proctor's
- 7 Strawsonizer for distributing paraffin on ground crops for turnip fly, &c.
- 8 Strawsonizer for distributing nitrates, lime, &c.
- 9 " " " liquids on hops
- 10 " " " sulphur or other powder on hops or trees
- 11 Spraying Machine, Clark's "Eclaire"
- 12 Horse Rake, by Ransomes

- 13 Haymaker, by Ransomes
- 14 Silo Stack Press, Johnson system
- 15 Portable Steam Engine
- 16 Enclosed Gear Mower
- 17 Self-Raking Reaper, the Indestructible
- 18 Hornsby Steel Binder, view from side
- 19 " " " behind [side]
- 20 Threshing Machine, Clayton & Shuttleworth Right
- 21 " " " Left side
- 22 Threshing Machine, Section to show internal arrangements
- 23 Threshing Machine, Clayton & Shuttleworth No. 1
- 24 " " " self-hinder
- 25 Mowing Machine drawn by three horses, self-hinder

MODERN EXAMPLES BY MESSRS. RANSOME, SIMS & JEFFERIES, LTD.

- 26 "Orwell" Cultivator with tines and wheels adjusted for grubbing three rows of potatoes or roots.
- 27 " " Cultivator with tines removing and bodies fitted for ridging and moulding up potatoes.
- 28 "Triplex" Cultivator fitted with poles and whips and ridging bodies for potato work.
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- 60 Three-row Ridger at work in South Lincolnshire. (Showing body.)
- 61 Work done by a R.S.L.M.—Y.L. Three Furrow Tractor Plough.
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- 63 Self-lift stubble Breaker.
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- 65 Three-Furrow R.S.L.M.—Y.L. Tractor Plough working with a Weeks Tractor.
- 66 Stand, Royal Show, Derby, 1921.
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- 2 Fresh laid egg showing air space at broad end, which expands during incubation and through which chicken pushes its head before hatching, also supplying the air necessary to life of chicken and providing room for movements during hatching process
- 3 A fresh laid egg carefully opened, showing circular germ which develops into the chicken, the membrane of yolk in folds to allow of expansion. This germ is always nearest the hen when sitting in whatever position egg be placed
- 4 Fresh laid egg opened and yolk turned upside down in the white to show the twisted ends of yolk membrane which by their weight keep the germ uppermost
- 5 Showing appearance of germ after 12 hours incubation, concentric circles appearing
- 6 Germ after 24 hours incubation. The dark patch being a portion non-active to plate probably due to first formation of blood taking place
- 7 Appearance after two days—yolk expanding, first appearance of blood vessels, embryo of chicken appearing
- 8 Appearance on 3rd day—rapid development of blood vessels, yolk becoming granular in appearance, embryo of chicken larger and when shell open pulsation of heart visible
- 9 Appearance on 4th day—yolk larger, blood vessels spreading over its surface
- 10 Showing effect of raising the temperature of incubator from 103 degrees (normal) to 120 degrees for 10 hours on 4th day, yolk becoming altered and membrane surrounding the embryo becoming visible
- 11 5th day—blood vessels spreading over almost the entire surface of yolk, embryo larger, and now surrounded by a protective circle of albumen through which the blood vessels pass
- 12 A portion of No. 11 enlarged, showing the blood vessels feeding the heart, eye of chicken visible
- 13 Embryo on 5th day dissected from the yolk, showing the membrane which envelops it when in the shell, also the elongated end of vertebral column
- 14 Appearance on removing portion of shell on 5th day, differing from No. 11 of same period, embryo being completely covered by blood vessels
- 15 Embryo of No. 14 removed from shell and slightly magnified showing rudimentary limbs
- 16 6th day—showing embryo of chicken now surrounded by a quantity of thinner albumen and chicken sinking into a cavity forming in the yolk
- 17 Embryo of No. 16 dissected from the yolk and magnified, showing its natural position at this period surrounded by albumen with blood vessels absorbing its nourishment from the yolk, and conveying it to the chicken by the umbilical cord
- 18 7th day—showing the chicken resting in the now well-formed folds of the yolk, with the main artery passing into the chicken
- 19 Embryo of No. 18 removed from shell and membrane, showing development of wings
- 20 No. 19 enlarged to show formation of head at this period
- 21 Empty shell on 7th day showing well-expanded membrane of air space
- 22 8th day—showing air space at broad end of shell and chicken sunk into a cavity between folds of yolk
- 23 9th day—opened more on the side of egg to show the formation of the cavity and folds of yolk. The yolk also becoming more granular in appearance.
- 24 The entire contents of shell removed on 9th day and placed in position to show the under surface of yolk, and back of chicken, yolk at this period having few blood vessels on under surface
- 25 9th day—removed from shell showing first formation of beak. Blood vessels larger (compare with No. 13)
- 26 Showing the effect of temperature of 120 degrees on 9th day for several hours, blood vessels expanded to utmost, and altered in appearance
- 27 10th day—showing well-developed folds of yolk and chicken somewhat altering its position
- 28 11th day—portion of covering membrane removed, showing position of main artery
- 29 11th day—shell opened near broad end of egg and covering membrane removed, showing chicken resting in a well-fitting cavity of yolk
- 30 11th day—removed from shell and covering membrane, showing growth of limbs and beak
- 31 11th day—contents of shell removed, yolk perforated and contents withdrawn, showing the membrane surrounding the chicken, and the method of absorbing its nourishment from the surface of yolk
- 32 11th day—removed from shell and slightly enlarged, showing growth of beak and body
- 33 11th day—contents of shell removed without breaking yolk membrane, and chicken placed in position to show two well-formed curves in main artery. For use, see No. 44
- 34 11th day—showing well-expanded air space
- 35 12th day—showing appearance of membrane and blood vessels, on carefully removing a portion of the shell
- 36 12th day—covering membrane removed, showing chicken turning its position, feathers appearing, also showing the membrane of air space
- 37 12th day—removed from shell
- 38 12th day—entire contents of shell removed, showing the white of the egg being absorbed by the yolk
- 39 Showing appearance of covering membrane on 13th day
- 40 13th day—with membrane removed, showing head of chicken coming nearer to air space
- 41 14th day—appearance on removing shell
- 42 14th day—removed from shell, showing growth of limbs
- 43 15th day—appearance of covering membrane, also well-developed air space and its membrane
- 44 15th day—covering membrane removed, showing the now well-formed curves of main artery to allow of free movement of limbs
- 45 15th day—removed from shell
- 46 16th day—membrane removed, showing main artery close to membrane of air space for aeration of blood
- 47 16th day—opened from opposite side of shell to No. 46
- 48 16th day—entire contents of shell removed, showing a small portion of white of egg left, but large amount of yolk, partially divided into two lobes, between which the chicken rests when enclosed in shell
- 49 17th day—portion of membrane removed
- 50 17th day—membrane removed, showing main artery passing close to air space and head of chicken getting into position for hatching
- 51 17th day—entire contents of shell removed, showing the still unabsorbed yolk, also the blood vessels of membrane round the shell
- 52 17th day—showing chicken with swollen neck, head in wrong position, and dead
- 53 Showing No. 52 from other side, with yolk removed
- 54 17th day—removed from shell

THE EMBRYOLOGY OF A CHICKEN—(*continued*).

- | | |
|---|--|
| 55 18th day—showing head of chicken almost in position for hatching, with beak near junction of membrane of air space and shell | 64 Showing position assumed by No. 63, on cutting the binding cords |
| 56 19th day—showing chicken in correct position for hatching, beak close to junction of membrane of air space and shell | 65 21st day—removed from shell, showing the remaining portion of unabsorbed yolk being absorbed into the body of chicken, thus providing its nourishment for short period after hatching |
| 57 19th day—removed from shell | 66 End of air space opened on 21st day, showing the loose folds of membrane surrounding the now restless chicken |
| 58 19th day—showing large amount of yolk still unabsorbed | 67 Coming through the shell |
| 59 No. 58 removed from shell in its natural position | 68 Five hours later |
| 60 20th day—removed from shell | 69 A snap shot one hour later |
| 61 20th day—showing still unabsorbed yolk | 70 Chicken twelve hours after hatching |
| 62 20th day—shell opened opposite side of No. 61 | |
| 63 21st day—shell carefully peeled off, showing chicken apparently bound by now almost useless blood vessels | |

CA

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| 1 The Queen, Drone, and Worker Bee | 29 Catching the Queen |
| 2 Tongue of Honey Bee (<i>Apis Mellifica</i>) | 30 Driving Bees from the Hive into an empty Skep |
| 3 Eye of Bee | 31 Subdued Bees after driving |
| 4 Tip of ditto, showing Spoon | 32 Driven Bees entering Skep. (Looking for the Queen Bee) |
| 5 Front leg of Bee, showing Antennæ Cleaner | 33 Frame of Comb, with Queen Cells |
| 6 Hind leg, showing Pollen Basket and Comb | 34 Group of Queen Cells, showing the opening at the end, with cover [Queen Cell] |
| 7 Bee's Wing, Hooklets and Folded Membrane | 35 Development of Larvae, Queen Cell, Section |
| 8 Sting of Honey Bee | 36 Egg attached to Cell Base |
| 9 Lancets and Sheath of Sting of Bee | 37 Pupa and Larva |
| 10 Abdomen of Bee | 38 Uncapping Combs for Extracting |
| 11 Salivary Gland | 39 Comb showing Foul Brood |
| 12 Parasite of Honey Bee— <i>Braula Coeca</i> | 40 Bacillus Alvei (Foul Brood in Bees) |
| 13 Foot of Braula Coeca | 41 " " (Rods and Spores) |
| 14 Apiary of Straw Hives | 42 " " (Spores) |
| 15 Old-fashioned Cottage Apiary | 43 Section of Bee |
| 16 Modern Apiary of Frame Hives | 44 " Eye of Bee |
| 17 Bee-keeper Folding Sections | 45 Heads of Bees |
| 18 Putting Foundations in Sections | 46 Egg and Pupa |
| 19 Sections in various stages of progress | 47 Legs of Bee showing Comb |
| 20 Fitting Comb Foundations in Frame [clearers | 48 Various Glands |
| 21 Hive with Supers and Sections: showing super | 49 Wax Plates |
| 22 Manipulating in Bee-dress and veil | 50 Foot of Bee |
| 23 Hiving a Swarm under difficulties | 51 Rows of Hives in a Fruit Orchard. |
| 24 Hiving Bees in Frame Hive | 52 A Cluster of Hives. Modern Method. |
| 25 Ditto (watching for the Queen) | 53 The late Mr. Broughton Carr. |
| 26 Uncovering the Frames, using the Smoker | |
| 27 Manipulating Frame, hanging position | |
| 28 " bottom upwards | |

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| 3 Wasp's Nest, underside of one of the Comb Tiers showing the pillars or props to keep the tiers apart | 7 Antennæ |
| 4 Wasp's Nest. In this, four or five of the tiers of Cell Combs have been removed to show cells and grubs in crown of nest | 8 Abdomen with sting <i>in situ</i> |
| | 9 Sting |
| | 10 Compound Eyes |
| | 11 Tongue |
| | 12 Foot |
| | 13 Wings |
| | 14 Hornet and Wasp |

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- 6 Spider, *Aranea Avicularia*
- 7 Large and Small White Butterfly, *Pieris Brassicae*
Rapae

- 8 Colorado Potato Beetle, *Doryphara tentaculata*
- 9 Wasp, *Vespa Vulgaris*
- 10 Crane Fly, *Tipula Oleracea*
- 11 Locust, *Orylus Dur*
- 12 The Teredo. A Mollusc which eats into the
Submarine Cable

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- 3 CLOVER WEEVIL. *Aption Apriana*
Larva, Pupa, and Perfect Insect
- 4 GREAT YELLOW UNDERWING MOTH. *Tryphonias promissa*
Larva, Pupa, and Perfect Insect
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Larva, Pupa, and Insect
Specimens of injured Wheat
- 6 GOUT FLY. *Chlorops torvus*
Larva, Pupa, Perfect Insect, and Injured Barley Stems
- 7 WIREWORM AND CLICK BEETLE. *Elater (Agriotes) Kuehni*
Wireworm, GRUB or CLICK BEETLE;
Eggs, Pupa, Beetle, and young turnip
with fibres of root destroyed by
grawing of wireworms
- 8 TURNIP SAWFLY. *Athalia spinarum*
Caterpillar, Hypernating Caterpillar in
cocoon of Silk and earth, Pupa in
silim or cocoon, Perfect Insect
- 9 CARROT FLY. *Psila rosea*
Maggot, Pupa, Perfect Insect, and Injured Carrot
- 10 EARWIG. *Forficula auricularia*
Common Earwig, Female, Forficula
auricularia
Ditto in young stage; and
Forficula forcipata, Male
- 11 COCKCHAFER. *Melolontha vulgaris*
Larva, Pupa, and Perfect Insect
- 12 LARGE WHITE BUTTERFLY. *Pieris brassicae*
Caterpillar, Pupa, and Perfect Insect
- 13 OX WAREBE FLY. *Hypoderma bovis*
First Stage of Maggot; Second Stage,
Third Stage, Pupa, and Perfect Fly
- 14 HORSE BOT FLY. *Oestrophilus equi*
Male and Female
- 15 TURNIP FLEA BEETLE. *Haltica (Phyllotreta) nemorum*
Maggot, Pupa, and Perfect Insect
- 16 DADDY LONG LEGS OR CRANE FLY. *Tipula oleracea*
Larva and Perfect Insect
- 17 HOP APHIS (GREEN FLY). *Aphis hamuli*
Pupa in early stage, also showing Wing
Cases, Male, Aphis, Female Aphis
(wingless form)
- 18 LADY BIRD. *Coccinella septempunctata*
Larva, Pupa, and Perfect Beetle
- 19 GARDEN CHAFER. *Phyllopertha Horticola*
Flying, walking, and maggot
- 20 GREEN ROSE CHAFER. *Cetonia Aurata*
Pupa in Cocoon, Earthen Cocoon, Larva

- 21 SHOT-BORER BEETLE. *Xyleborus diepar*
showing workings of the Shot-horing Beetles
Male Beetle and Female Beetle, Plum stems
 - 22 MOLE CRICKET. *Gryllotalpa Vulgaris*
Flying, walking, and Larva
 - 23 POTATO THIRPS. *Thrips Minimalissima*
Female Potato Thirps, with wings
displayed, and Larva
 - 24 THE WOOL WASP. *Sirex Gigas*.
Male. Medium size of wings, Larva,
Sirex Juvenous, female, size various
 - 25 COMMON VAPOURER Moth. *Oryctia Antiqua*
Male Moth, Female, Eggs on Cocoon.
Pupa in net-work Cocoon, Caterpillar
 - 26 THE DIAMOND-BACK Moth. *Plutella Cruciferarum*
Moth with wings extended, Moth at
rest. Pupa in net-work Cocoon
Caterpillar
 - 27 CORN APHIS. *Aphis (Siphonophora) Granaria*.
Winged Female, Wingless Females
Larva, Empty Shell of Larva from
which a Parasite has hatched
 - 28 SCALE INSECTS. *Aspidiotus Osteiformis*. Oyster
Scale (Pear tree) outside and inside
view, and Female. *Aspidiotus Zonatus*
type of males of all the Diaspis.
Mytilaphis Pomorum, Mussel Scale
(Apple) outside view. Inside view
showing the Eggs, Female Scale In-
sect shrunk after egg-laying
Pear Tree } Branches showing natural
Apple Tree } size of scale
 - 29 PLANT BUGS. *Lycus Umbellatorum*
Flying, at rest. Pupa of *Lycus Solani*
 - 30 APPLE SAWFLY. *Tenthredo (Hoplocampa) Testu-
dinae*
Larva, and injured Apple
 - 31 PEAR OR CHERRY TREE SAWFLY OR SLUG WORM
Tenthredo Cerasi or *Eriocampa Limacina*
Larva in two stages, Cocoon
- Larvae.
- 32 GREEN GARDEN CHAFER. *Cetonia Aurata*
CABBAGE OR TURNIP GALL WEEVIL. *Centonychus Sulcicollis*
WIREWORM (grub of Click Beetle.) *Elater Lineatus*
 - 33 ONION FLY. *Anthomyia Ceparum*
DADDY LONGLEGS. *Tipula Oleracea*
 - 34 LEOPARD Moth. *Zenzena Mecalli*
WINTER Moth. *Chelostoma Brumata*
CLOUDED YELLOW BUTTERFLY. *Colias Edusa*
WOOL-GATHERING BEE. *Anthidium Manicatum*
FOX-COLOURED PINE SAWFLY. *Lophyrus Rufus*
 - 35 POTATO THIRPS. *Thrips Minimalissima*
LETUCE GREENFLY. *Aphis Lactucae*
EARWIG. *Forficula Auricularia*
LESSER BOCKY MOUNTAIN LOCUST. *Cale tenus*
Atlanicus

A U**INJURIOUS INSECTS AND COMMON FARM PESTS—Continued.**

From "Agricultural Entomology," by Miss E. A. Ormerod.

- 35 AMERICAN BLIGHT (WOOLLY APHIS). *Schizoneura lanigera*
Infested Apple-Spray. Wingless Viviparous Female and Young, and small Egg-bearing Female. Pupa
- 36 BEAN APHIS. *Aphis russica*, Linn.
Bean-shoot, with Aphides. Male and Wingless Female
- 37 CURRENT GALL MITE. *Phytoptus* (species?)
Infested Buds
- 38 RED SPIDER. *Tetranychus telarius*
Whole Insect, and Hairs on the Foot
- 39 CELERY AND PARSNIE FLY. *Tephritis conopodina*, Fah.
Whole Insect Maggot and Pupa figured in blistered leaf
- 40 GOOSEBERRY AND CURSANT SAWFLY. *Nematus ribesii*
Male Sawfly, Caterpillars and Cocoon
- 41 MANGOLD OR BEET FLY. *Anthonomia (Chortophila) betae*
Female Fly, Pupa, Eggs
- 42 ONION FLY
Maggot and Pupa. Pupa in stored Onion
- 43 SAWFLY CATERPILLARS destroying Turnip-leaf
- 44 TURNIP SAWFLY. *Hymenoptera*
Caterpillars, Pupa, Pupa-case
- 45 BEAN BEETLES, Grub and Pupa, Injured Beans.
- 46 ELM-BARK BEETLE and Maggots workings in bark
- 47 *Meligethes acicus*
Beetle, Maggot, Infested Flower
- 48 MUSTARD BEETLE
Whole Insect, Grub
- 49 BLACK VINE WEEVIL. *Otiorkognchus sulcatus*
Whole Insect, Maggot and Pupa
- 50 CLAY-COLOURED WEEVIL. *O. pictipes*, Fab (*septentrionalis* Steph. Man.)
- 51 NUT WEEVIL
Whole Insect, Maggot, Pupa. Filbert pierced by Weevil
- 52 RASPBERRY BEETLES. *Bystrus pomonae*
Whole Insect, Maggot. Raspberry Fruit
- 53 CODLIN MOTH. *Carpocapsa pomonella*
Whole Insect, Caterpillar. Apple infested with Caterpillars
- 54 THE CURRANT CLEARWING. *Ergilia tipuliformis*
Moth, Larva in Currant Stem
- 55 THE SMALL EAMINE MOTH. *Hyponomeuta padella*. Tasch
Moth Larva
- 56 MAGGIE MOTH; CURRANT MOTH. *Abraza grossulariata*
Moth, Larva
- 57 WINTER MOTH; EVERSHAM MOTH. *Chelimatoxia brunnata*
Male, and Wingless Females
- 58 WOOD LEOPARD MOTH. *Zeuzera osmana*
Female, Head of Male, and Caterpillar
- 59 FIELD OR MILKY SLUG. *L. agrestis*
BLACK SLUG. *L. ater* (var. *empiricorum*)
Whole Insect, in repose, Eggs

B.B**ROOT CROPS.**

This series has been produced under the personal supervision of Messrs. Sutton & Sons, of Reading.

Text Book, "Sutton's Farmer's Year-Book."

Beautifully Painted, 6s.; Plain Photographs, 2s.

1 Improvement of Mangel by cultivation	10 Imperial Green Globe Turnip	19 Improved Thousand-headed Cabbage or Kale
2 Oxheart Orange Globe Mangel	11 Purple-top Mammoth Turnip	20 Early Drumhead Cabbage, Improved Large Late Drumhead Cabbage, Drumhead Savoy
3 Berks Prize Yellow Globe Mangel	12 Red Paragon Turnip	21 Improved Yellow Intermediate Grand White Belgian and Long Red Altringham Carrots
4 Golden Tankard Mangel	13 Pomeranian White Globe Turnip	
5 Yellow Intermediate Mangel	14 Crimson King Swede	
6 Crimson Tankard Mangel	15 Champion Purple-top Swede	
7 Mammoth Long Red Mangel	16 Champion Short-top Kohl Rabi	
8 Favourite Turnip (Yellow fleshed)	17 White Belgian and Red Intermediate Carrot	
9 All the Year Round Turnip	18 Early Ox-heart, Imperial, and Thousand-headed Cabbage	

BY**PROFITABLE CULTIVATION OF SUGAR BEET.**

Published by kind permission of the Chilean Nitrate Committee.

Beautifully Coloured Slides, 6s. each. Plain Slides, 2s. each.

Printed Notes can be supplied with the Slides.

1 A British Sugar Beet Factory, Illustrating Root System of Sugar Beets and great feeding area.	17 Filling and weighing sacks of sugar.
2 Varieties of Sugar Beet.	18 Sugar Stove.
4 Varieties of Sugar Beet.	19 Loading sugar on railway trucks.
5 Fancy roots due to bad cultivation.	20 A sack of sugar.
6 Effect of subsoiling.	21 A silo for tops and pulp—side view.
7 Singling.	22 A silo for tops and pulp—front view.
8 Sugar Beet Lifter and subsoiler combined.	23 H. Hone etc.
9 Lifting, pulling and topping Sugar Beet.	24 Messrs. Bennett & Nicholson, etc.
10 Lifted Beet.	25 R. J. Cordwney, etc.
11 Lifting Beet.	26 G. Ball, etc.
12 Some good roots.	27 J. G. Whittles, etc.
13 Badly topped roots and correctly topped roots.	28 D. W. Bardley, etc.
14 Carting Sugar Beet.	29 W. Weavers, etc.
15 Unloading Beet at Factory.	30 Official Trials by the Worcestershire County Council at Pershore, etc.
16 Unloading Beet at Factory.	31 Messrs. Brinton, Ltd., etc.
17 Filling and weighing sacks of sugar.	32 H. H. Harris, etc.
18 Unloading Beet at Factory.	33 R. Parry, etc.

For a Set of Slides on the Manufacture of Beetroot Sugar, see Industries, Section 7 of this Catalogue.

B G**ALLOTMENTS—GARDEN PRODUCE.**

This Series of Slides, showing various Vegetables and Fruits suitable for growing on Parish Allotments, has been arranged by Messrs. Sutton and Sons, of Reading. The slides are photographs of actual specimens, that have been grown from this Firm's Seeds, and are not from imaginary drawings.

Beautifully Coloured, 6s.; Plain Slides, 2s. each.

- | | |
|---|--|
| 1 Aparagus. Bunch of Sutton's Perfection | 21 Mushroom. Showing bed in Musbroom house |
| 2 Broad Beans. Pods of Sutton's Green Longpod compared with the ordinary variety and pods of Sutton's Giant Windsor, showing relative size* | 22 " An enlarged single specimen. Illustrating typical Musbroom |
| 3 Dwarf Beans. Single plant of Sutton's Triumph | 23 Onion. A bunch of Sutton's Improved Queen |
| 4 Runner Beans. Cluster of pods of the climbing French Bean, Sutton's Tender and True, and a cluster of pods of Sutton's Scarlet, showing relative sizes | 24 " Two specimens of the Sutton Globe and 3 specimens of Sutton's A 1, showing comparative sizes and form, and are reproduced on the same scale as No. 23 (Sutton's Improved Queen) |
| 5 Kale. Single plant of Sutton's A 1 | 25 Peas. Pods of Sutton's Bountiful and Kentish Invicta, showing comparative sizes |
| 6 " Sutton's Drumhead and Sutton's Arctic Green and Purple | 26 " Pods of Sutton's Exhibition Marrowfat and Yorkshire Hero, showing comparative sizes, and pods of Sutton's Bountiful |
| 7 Brussels Sprouts. Sutton's Exhibition, Sutton's Dwarf Gem, and Sutton's Waterloo, the three varieties showing relative height and character | 27 " Pods of Sutton's Early Marrowfat and Prince of Wales, showing comparative sizes |
| 8 Broccoli. Two specimens each of Sutton's Superb Early white, and Sutton's Late Queen | 28 " Growing plants in pot of Sutton's Seedling Marrowfat, showing suitability for forcing |
| 9 Cabbage. Portion of a plot of Sutton's Earliest, and 3 plants of Sutton's Imperial | 29 " Pods of Sutton's Empress of India, and Sutton's Late Queen |
| 10 Carrots. Sutton's New Red Intermediate, bunch of 5, compared with two specimens of James's Scarlet Intermediate, showing proportionate size | 30 " Pods of Sutton's Early Marrowfat and Sutton's Windsor Castle |
| 11 Carrots. Sutton's Early Gem, bunches of 8, and Sutton's Champion Horn, bunch of 12, showing relative sizes | 31 " Pods of Sutton's Perfection and Sutton's Magnum Bonum |
| 12 Capsicum and Chili. Sutton's Coral Red, Sutton's Mammoth Long Red, and East India Cayenne Chili, Sutton's Erect fruiting, Golden Dawn, and Mammoth Long Red Capsicum | 32 " Sutton's A 1 (wrinkled) and Sangster's No. 1, pods showing comparative sizes |
| 13 Cauliflower. Two specimens each of Sutton's Autumn Mammoth, and Sutton's Magnum Bonum | 33 " Illustrating the process of handpicking peas for seed |
| 14 Lettuce. Plot showing Sutton's Favourite Cabbage and Sutton's Mammoth White Cos in growth | 34 Savoy. Sutton's Dwarf Green Curled, single plant |
| 15 Lettuce. Three plants of Sutton's White Heart Cos | 35 Turnip. Sutton's Early Snowball, several specimens and basket |
| 16 Ma-row. Group of 5 varieties. Sutton's Long White, Sutton's Long Green, Sutton's Vegetable, Long Cream and Pen-y-Byd, showing comparative sizes | 36 Tomato. A bunch of six specimens of Sutton's Perfection and bunch of 32 fruits of Sutton's Golden Nugget, illustrating the two most dissimilar types of tomato, and showing comparative sizes |
| 17 Melon. Single fruit of Sutton's Hero of Lockinge | 37 Potato. Sutton's Satisfaction and Sutton's early Regent in ha-kets |
| 18 " Single fruit with slice removed of Sutton's Scarlet | 38 " Sutton's Magnum Bonum and Sutton's Windsor Castle in baskets |
| 19 " Single fruit with slice removed of Sutton's Royal Favourite | 39 " Sutton's A 1 in basket |
| 20 " Photograph of a growing crop of Sutton's Royal Favourite, in Melon house at the Royal Gardens, Windsor | 40 " Illustrating the process of handpicking potatoes for seed |

- 41 First Prize Exhibits, Royal Caledonian Horticultural Society's Show, September, 1905
 42 Sutton's Globe Beet
 43 Sutton's Perfection Beet
 44 Sutton's Cascade Tomato

U Q**GARDEN PRODUCE.**

Published by the kind permission of MESSRS. SUTTON & SONS, of Reading.

Beautifully Painted, 6s.; Plain Slides, 2s. each.

- | | | |
|---|-------------------------------------|---|
| 1 White Jerusalem Artichoke | 14 Runner Beans. Best of All | 39 Melon. Ringleader |
| 2 Giant French Asparagus | 15 Garden Cabbage. Earliest | 40 Group of Mushrooms |
| 3 Blood Red Beet | 16 Garden Cabbage. Flower of Spring | 41 Onion. Improved Queen |
| 4 Blood Red Garden Beet | 17 Imperial Garden Cabbage | 42 Garden Peas. Nonpareil Marrow |
| 5 Broccoli. Superb Early White | 18 Short Carrot. Inimitable Forcing | 43 Garden Peas. Nonsuch |
| 6 Snow-White Broccoli | 19 Carrot. Scarlet. Intermediate | 44 Lord Roberts. Garden Peas |
| 7 Brussels Sprouts. Sutton's Exhibition | 20 Cauliflower. Purity | 45 Duchess of York. Garden Peas |
| 8 Broad Beans. Green Giant | 21 Pigmy Chili | 46 Potatoes. Invincible |
| 9 Giant Windsor Broad Beans | 22 New Cucumber. Lord Roberts | 47 Potatoes. Satisfaction |
| 10 Climbing French Bean. Earliest of All | 23 Giant Hemp | 48 Potatoes. Triumph |
| 11 Princess of Wales. French Climbing Beans | 24 Arctic Kale | 49 Radish. Earliest of All |
| 12 Dwarf French or Kidney Beans. Perfection | 25 Extra Curled Scotch Kale | 50 Long Radish. Earliest Frame |
| 13 Dwarf French or Kidney Beans. Plentiful | 26 Cabbage Lettuces. Favourite | 51 Radish. Forcing White Olivi |
| | 27 Cos Lettuce. White Heart | 52 Turnip. White Gem |
| | 28 Cos Lettuce. Mammoth White | 53 A Potato. Curious formation like a duck. Messrs. Cannell and Sons) |
| | 29 Marrow. Perfection | |

B X Y**GRASSLAND AND ROTATION CROPS.**

Published by kind permission of the Chilean Nitrate Committee.
Beautifully Coloured Slides 6s. each. Plain Slides, 2s. each.

Printed Notes can be supplied with the Slides.

A Series showing comparisons of crops treated with various fertilisers and untreated carried out under test condition.

- 1 No Manure. T. Tottey.
- 2 Manured with Phosphates and Potash. T. Tottey.
- 3 Manured with Nitrate of Soda, Phosphates and Potash. T. Tottey.
- 4 Manured with Phosphates and Potash, and Nitrate of Soda, Phosphates and Potash. T. Tottey.
- 5 Original Pastures before being ploughed up and re-seeded. W. R. Reeves.
- 6 . No Manure. W. R. Reeves.
- 7 Manured with Phosphates and Potash. W. R. Reeves.
- 8 Manured with Nitrate of Soda, Phosphates and Potash. W. R. Reeves.
- 9 Manured with Nitrate of Soda, Phosphates and Potash, and Potash, and Phosphates and Potash. W. R. Reeves.
- 10 No Manure. Ralph Steel.
- 11 Manured with Basic Slag and Kainit. Ralph Steel.
- 12 Manured with Nitrate of Soda, Basic Slag and Kainit. Ralph Steel.
- 13 Official Trials by The Staffordshire Agricultural Committee.
- 14 Untreated. E. Ratcliffe.
- 15 Manured with Phosphates and Potash. E. Ratcliffe.
- 16 Manured with Phosphates, Potash and Nitrate of Soda. E. Ratcliffe.
- 17 New System of Grassland Farming at the Farm School, Peckridge, Staffordshire.
- 18 Meadow Hay.
- 19 Clover.
- 20 "Seeds" Hay.
- 21 Wheat. No Manure.
- 22 Wheat. Manured with 1 cwt. Nitrate of Soda.
- 23 Oats. No Manure.
- 24 Oats. Manured with 1 cwt. Nitrate of Soda.
- 25 Mangolds.
- 26 Swedes.
- 27 Turnips.
- 28 Sugar Beet.
- 29 Potatoes (King Edwards).
- 30 Marrow Stem Kale.
- 31 Forage Crops (Oats, Beans and Peas).
- 32 Lucerne.
- 33 Fuggle Hops (Untreated).
- 34 Fuggle Hops (Treated).
- 35 Fuggle Hops (Untreated) (Treated).

B N F**LUCERNE.**

Beautifully Coloured Slides, 6s. each. Plain Slides, 2s. each.

- 1 Lucerne.
- 2 Introductory.
- 3 Branching roots.
- 4 An eight year old Alfalfa Plant.
- 5 Alfalfa Blossoms enlarged.
- 6 Extract. "The Cultivation and feeding, etc."
- 7 "Alfalfa transforms, etc."
- 8 Table. Comparison with corn.
- 9 Yellow Trefoil and Alfalfa Seed Pods.
- 10 Sweet Clover Pods.
- 11 Dodder and Alfalfa Seed.
- 12 Table. Protein in early cuttings.
- 13 Extract. "Cut in early bloom, etc."
- 14 "Cut as often as it blossoms."
- 15 Gathering an Alfalfa Crop.
- 16 A Derrick Stacker.
- 17 Lattice Rack for feeding Alfalfa to Sheep.
- 18 Alfalfa Field after 9 days cutting.
- 19 Fourth cutting of Alfalfa.
- 20 Second cutting of Alfalfa.
- 21 Table. Food value of several fodder crops.
- 22 " From Texas Experimental Station, Bul. No 68.
- 23 Table Relative values of different cuttings.
- 24 " Comparative crop and feeding values.
- 25 Feeding values.
- 26 Farmer viewing one of his Alfalfa fields.
- 27 Harvesting Alfalfa.
- 28 Table. Roughness. Value per ton when Alfalfa is worth \$1.00 per ton.
- 29 Diagram. Approximate yield per acre.
- 30 Five year old Alfalfa.
- 31 Alfalfa one year old, showing effects of inoculation.
- 32 A good type of a four-year old Alfalfa plant.
- 33 Alfalfa plant and roots showing Bacteria Nodules.
- 34 Tubercles on Clover Roots.
- 35 Alfalfa roots showing normal Nodules.
- 36 "And there's still more to follow."
- 37 Pot Culture Experiments at University of Illinois.
- 38 Six months' growth of Alfalfa foliage.
- 39 A 400 ton Rick of Alfalfa.
- 40 A Cable Derrick. Provided with a Grapple Fork.
- 41 F. D. Coburn.
- 42 Measuring Plant.
- 43 Cutting Field.
- 44 Bunch of Lucerne.

B N G**FOODS AND FEEDING.**

Plain Slides, 2s. each.

- 1 Notes on Feeding Stuffs.
- 2 Ration for 2½ to 3 Gallon Cow.
- 3 Calculation of Unit Price.
- 4 Feeding Standard (Keilner) per 1,000 lbs. live weight.
- 5 Percentage in Food.
- 6 Digestible Matter in 1,000 lbs. of various foods.
- 7 Relation of "Nitrogenous" to Non-Nitrogenous Constituents in digestible part of food.
- 8 Experiments with Sheep.
- 9 Composition of a crop of Meadow Grass.
- 10 Digested Matter (included fibre) per 1,000 lbs. of food.
- 11 Composition of Meadow Hay harvested at different dates.
- 12 Digestion of Hay by Sheep.
- 13 Ash Constituents and Nitrogen in 1,000 lbs. of various animal and other products.
- 14 Digestion of Horse and Sheep compared. Experiments with Horses.
- 15 Experiments with Pigs.
- 16 Per 1,000 lbs. live weight per week required to produce 100 lbs. increase.
- 17 Comparison of fattening Oxes, Sheep and Pigs.
- 18 Percentage Composition of whole bodies of animals.
- 19 Comparison of constituents of weekly increase of fattening ox and milk of a cow.
- 20 Comparison of constituents of cheese and whey.
- 21 Comparison of Cheese and Whey.

For Slides on The Supply of Clean Milk, see "Medical," Section 1, and for Dairying, see "Industries," Section 7 of this Catalogue.

B I**PASTURE GRASSES.**

This series has been arranged by Martin J. Sutton, Esq., of Reading, Fellow of the Linn. Soc., and Member of the Councils of the Royal Agricultural Society and Bath and West and Southern Counties Society, and the slides are taken from the fine illustrations in his work on "Permanent and Temporary Pastures."

The odd numbers in the following list show the whole plant, root, stem and flower; while the even numbers give a description of the grass and a magnified drawing of the seed with and without chaff.

Text Book, "Permanent and Temporary Pastures," price 1s. Simpkin & Co.

Beautifully Painted, 5s.; Plain Photographs, 2s. each.

1	Agrostis Alba—var. stolonifera (<i>Fioria or Creeping Bent Grass</i>)	Seed and Description	23	Lolium perenne (<i>Perennial Rye Grass</i>)	Seed and Description
2	" "	Seed and Description	24	Lolium italicum (<i>Italian Rye Grass</i>)	Seed and Description
3	Alopecurus pratensis (<i>Meadow Foxtail</i>)	Seed and Description	25	Lolium italicum (<i>Italian Rye Grass</i>)	Seed and Description
4	" "	Seed and Description	26	"	Seed and Description
5	Anthoxanthum odoratum (<i>Sweet-scented Vernal</i>)	Seed and Description	27	Phleum pratense (<i>Timothy or Meadow Catstail</i>)	Seed and Description
6	" "	Seed and Description	28	Poa Pratensis (<i>Smooth-stalked Meadow Grass</i>)	Seed and Description
7	Avena flavescens (<i>Yellow Oat Grass</i>)	Seed and Description	29	"	Seed and Description
8	" "	Seed and Description	30	"	Seed and Description
9	Cynodon dactylon (<i>Crested Dog-tail</i>)	Seed and Description	31	Poa Trivialis (<i>Rough-stalked Meadow Grass</i>)	Seed and Description
10	" "	Seed and Description	32	"	Seed and Description
11	Dactylis glomerata (<i>Rough Cock's-foot</i>)	Seed and Description	33	Poa nemoralis sempervirens (<i>Evergreen Meadow Green</i>)	Seed and Description
12	" "	Seed and Description	34	"	Seed and Description
13	Festuca pratensis (<i>Meadow Fescue</i>)	Seed and Description	35	Trifolium repens perenne (<i>Perennial White Clover</i>)	Botanical description
14	" "	Seed and Description	36	"	Botanical description
15	Festuca elatior—var. fertilis (<i>Tall Fescue</i>)	Seed and Description	37	Trifolium pratense (<i>Red, or Broad Clover</i>)	Botanical description
16	" "	Seed and Description	38	"	Botanical description
17	Festuca heterophylla (<i>Various-leaved Fescue</i>)	Seed and Description	39	Trifolium pratense p. renne (<i>Perennial Red Clover</i>)	Botanical description
18	" "	Seed and Description	40	"	Botanical description
19	Festuca evina tenuifolia (<i>Fine-leaved Sheep's Fescue</i>)	Seed and Description	41	Trifolium hybridum (<i>Alsike Clover</i>)	Botanical description
20	" "	Seed and Description	42	"	Botanical description
21	Festuca durissima (<i>Hard Fescue</i>)	Seed and Description	43	Medicago lupulina (<i>Common Yellow Clover, or Trefoil</i>)	Botanical description
22	" "	Seed and Description	44	"	Botanical description
			45	Achillea millefolium (<i>Yarrow, or Milfoil</i>)	Botanical description
			46	"	Botanical description

B H INJURIOUS GRASSES AND WEEDS.

This series, like the "Pasture Grasses," has been produced from a set of original drawings under the instructions of Martin J. Sutton, Esq., Fellow of the Linnean Society and Member of the Councils of the Royal Agricultural Society and Bath and West and Southern Counties Society.

Beautifully Painted, 5s.; Plain Slides, 2s. each.

GRASS WEEDS.

1	Briza media (<i>Quaking Grass</i>).	6	Aira (Deschampsia) coesp'tosa (<i>Toasock Grass</i>).
2	Alopecurus geniculatus (<i>Floating Foxtail Grass</i>).	7	Molina caerulea (<i>Purple Heath Grass</i>).
3	Bromus erectus (<i>Erect Brome Grass</i>).	8	Festuca pynros (<i>Barren Fescue Grass</i>).
4	Bromus mollis (<i>Soft Brome Grass</i>).	9	Avena pubescens (<i>Soft Oat Grass</i>).
5	Triticum (Agropyrum) repens (<i>Couch Grass</i>).	10	Holcus lanatus (<i>Yorkshire Fog Grass</i>).

MISCELLANEOUS WEEDS.

11	Tussilago farfara (<i>Coltsfoot</i>).	17	Rumex acetosella (<i>Sheep's Sorrel</i>).
13	Poterium sanguisorba (<i>Common Burnet</i>).	18	Rumex acetosa (<i>Common Sorrel</i>).
13	Plantago lanceolata (<i>Plantain or Ribwort</i>).	19	Conium maculatum (<i>Hemlock</i>).
14	Rumex obtusifolius (<i>Field Dock</i>).	20	Rhinanthus crista-galli (<i>Yellow Rattle</i>).
15	Cuscuta trifolia (<i>Clover Dodder</i>).	21	Centaurea nigra (<i>Knapweed or Black Head</i>).
16	Anthemis cotula (<i>Faethid Mayweed or Chamomile</i>).		

SLIDE BOXES

Particulars of boxes of all kinds for storing and carrying will be found on page 235.

BF ILLUSTRATIONS FROM THE RESULTS OF THE ROTHAMSTED EXPERIMENTS.

Published under the authority of the Lawe's Agricultural Trust.

Beautifully Painted 6s. 6d.; Plain Photographs, 2s. each.

Nos. 1, 2 and 3 Coloured Tables of results of experiments on the growth of Root-crops for many years in succession on the same land:-

1 White Turnips, and Swedish Turnips, commencing 1843

2 Sugar Beet, 5 years, 1871-5

3 Mangold Wurzel, commencing 1876

No. 4—Coloured Table of results of Experiments on the growth of Barley, for many years in succession on the same land, commencing 1851

Nos. 5, 6, 7 and 8—Coloured Tables of results of experiments on the growth of various Leguminous Crops, each for many years in succession on the same land, commencing 1847:-

5 Produce of Beans, per acre per annum

6 Nitrogen in the Produce of Beans, per acre per annum

7 Produce of Red Clover (as Hay), on ordinary arable land

8 Produce of Red Clover (Hay and Constituents), on rich Garden-soil

No. 9—Coloured Table of results of Experiments on the Growth of Wheat, for many years in succession on the same land, commencing 1849-4

Nos. 10, 11, 12, 13 and 14—Coloured Tables of results of Experiments on Rotation of Crops; 45 years, commencing 1848:-

10 (1) Swedish Turnips, produce per acre; 12 courses

11 (2) Barley, produce per acre; 11 courses

12 (3) Clover or Beans, produce per acre; 11 courses

13 (4) Wheat, produce per acre. 11 courses

14 (5) Average produce, and yield of Nitrogen per acre per annum; 3 courses

No. 15—Photographs of Roots (Swedish Turnips), grown in Rotation without Manure, with Mineral Manure, and with Mineral and Nitrogenous Manure

Nos. 16, 17 and 18—Photographs of various Leguminous plants, grown in Experiments on the Fixation of Free Nitrogen:-

16 Peas, Vetches, and Yellow Lupins; grown in pots

17 Peas; grown in pits

18 Sainfoin; grown in pits

No. 19—Table of Results relating to Nos. 17 and 18

Nos. 21 and 22—Coloured Tables of results of Experiments on the Growth of Potatoes, for many years in succession on the same land, commencing 1876:-

21 Manures, and Produce per acre (Sound and Diseased)

22 Specific Gravity, and Percentage Composition, of Sound Tubers

Nos. 23, 24, 25 and 26—Coloured Tables of results of Experiments on the Mixed Herbage of Permanent Grass for many years in succession on the same land, commencing 1856:-

23 Manures, and Produce (as Hay), per acre per annum

24 Botanical Composition of the Herbage

25 Summary of the Botanical Composition, per cent., per acre, &c.

26 Summary of the Chemical Composition of the Produce, per acre

No. 27—Table of results of Experiments on Wheat grown in alternation with Fallow, and Wheat grown year after year continuously, without Manure; 42 years, 1850-1 to 1891-2

No. 28—Table showing the Home Produce, Import Consumption, and Price, of Wheat, in the United Kingdom—40 Harvest-years, 1852-3 to 1891-2 inclusive

No. 29—List of the Rothamsted Field Experiments

No. 30—Plan of the Plots in Barufield, on which the experiments with Root-crops have been made

No. 31—Plan of the Plots in Hoesfield, on which Experiments have been made;—

(1) On Barley, commencing 1852

(2) On Leguminous Crops, commencing 1849

(3) On Alternate Wheat and Fallow, commencing 1851

(4) On Potatoes, commencing 1876

No. 32—Plan of the Plots in Broadbalk-field, on which Wheat has been grown for more than 50 years in succession, commencing 1843-4

No. 33—Plan of the Plots in Agiell Field, on which Experiments on Four-Course Rotation have been made, commencing 1848

No. 34—Plan of the Plots in the Park, on which experiments have been made on the Mixed Herbage of Permanent Grass-land, commencing 1866

No. 35—Photographs and Plans of the Rothamsted Laboratory

No. 36—Photographs and Plan of the Rothamsted Sample House

No. 37 Coloured Drawing and Description of the Rothamsted Rain gauges

No. 38—Coloured Drawing and Description of the Rothamsted Drain gauges

No. 39—Table showing the Rainfall at Rothamsted, measured in a gauge one-thousandth of an acre area—40 Harvest-years, 1852-3 to 1891-2

No. 40—Table showing the Rainfall; also the amount of Percolation through Drain-gauges containing, respectively, 20 inches, 40 inches, and 60 inches, d.p.h. of Unmanured, and uncropped Soil and Subsoil, in natural state of consolidation—22 Harvest years 1870-1 to 1891-2

No. 41 Table showing the loss of Nitrogen (as Nitrates), respectively through 20 inches, 40 inches, and 60 inches depth of Soil and Subsoil, also the loss of Nitrogen calculated as Nitrate of Soda—15 Harvest years 1877-8 to 1891-2

No. 42—Table showing the amounts of Nitrogen supplied in Manure, and estimated to be recovered in Increase of Crop, lost in Drainage, accumulated as Crop-residue in the surface-soil, and not so accounted for, in the case of differently manured Wheat plots—averages per acre per annum for 30 Harvest years, 1851-2 to 1889-1

No. 43—Table illustrating the loss of Nitrogen; as N trates, in a wet autumn and winter, in the drainage from the differently manured Wheat plots in Broadbalk-field; also the loss calculated as Nitrate of Soda: Season 1891-2, 49th year of the Wheat experiments

No. 44—Coloured Diagrams illustrating the results of Experiments on the Feeding of Animals; showing the proportions of Nitrogenous, of Non-nitrogenous, and of Total Organic Substance consumed—I. Per 100 lb. Live-weight per week, II. To Produce 100 lb. Increase in Live-weight.

B D**EFFECTS OF MANURES.**

These slides are made from a series of photographs of actual specimens grown with various manures, and mostly contain from four to eight samples in each slide.

Beautifully Painted, 6s. Plain Photographic Slides, 2s. each.

- | | |
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| 1 Wheat. Experiment with and without Nitrogenous Manures | 22 Vetches and Wheat. Yield of experiments with and without Potash, Phosphoric Acid, and Nitrogen |
| 2 Barley. " " " " | 23 Wheat. Experiments with (1) No Manure. (2) Potash and Phosphoric Acid. (3) Potash, Phosphoric Acid and Nitrogen |
| 3 Peas. " " " " | 24 Maize. Manurial Experiments with Phosphoric Acid, Potash, and in addition, Nitrogen as Nitrate of Soda |
| 4 Oats. " " " " | 25 Hemp. Manurial Experiments with Phosphoric Acid, Potash, and in addition, Nitrogen as Nitrate of Soda |
| 5 Oats. Experiments with Green Manures | 26 Tobacco. Manurial Experiments with Nitrogen and Superphosphate, and Nitrogen and Phosphate of Potash |
| 6 Peas and Oats. Experiments with and without Potash, Phosphoric Acid, and Nitrogen for comparison | 27 Beetroot. Manurial Experiments with Phosphoric Acid, Potash, and in addition, Nitrogen as Nitrate of Soda |
| 7 Vetches. Experiments with and without Potash, Phosphoric Acid, and Nitrogen | 28 Carrots. Manurial Experiments with Phosphoric Acid, Potash, and in addition, Nitrogen as Nitrate of Soda |
| 8 Peas and Wheat. Yield of Experiments, with and without various manures | 29 Do. as above, showing roots |
| 9 Summer Rye. Experiments with and without Superphosphate, in autumn and spring | 30 Field Beans. Manurial Experiments with Phosphoric Acid, Potash, and in addition, Nitrogen as Nitrate of Soda |
| 10 Summer Rye. Experiments with and without Phosphate Powder, in autumn and spring | 31 Peas. Manurial Experiments with Phosphoric Acid, Potash, and in addition, Nitrogen as Nitrate of Soda |
| 11 Barley. Experiments with and without Superphosphate and Phosphate Powder | 32 Potatoes. Manurial Experiments with Phosphoric Acid, Potash, and in addition, Nitrogen as Nitrate of Soda |
| 12 Barley. Yield of experiments shown in a late No. 11 | 33 Clover. Experiments with and without Phosphoric Acid in form of Superphosphate and Thomas' Phosphate Powder |
| 13 Barley. Manurial Experiment on a Loamy Soil. (1) without Phosphoric Acid. (2) With Phosphoric Acid as Superphosphate. (3) With Phosphoric Acid as finely-pulverised Thomas' Phosphate | 34 Fuchsia. Manurial Experiments in Hot-bed Soil. Without Nutritive Salt Mixture and with small and larger quantities of Albert's Highly Concentrated Horticultural Mixture |
| 14 Buckwheat and Peas. Experiments with Phosphoric Acid and Potash | 35 Geraniums in Hot-bed Soil. Manurial Experiments with and without Albert's Highly Concentrated Horticultural Mixture |
| 15 Oats. Green Manuring Experiments | 36 Crop Map and Isotherms of Great Britain |
| 16 " Yield of experiments with and without Green Manures | 37 Carrots grown on various types of soil |
| 17 " Illustrating the Influence of Phosphatic Manuring on the Utilization of Nitrate Nitrogen | 38 Chalk Subsoil. This land can be cultivated although the soil is thin |
| 18 " Experiments with and without Phosphoric Acid in different forms | 39 Gravel Subsoil. This land cannot be cultivated because the soil is too thin for a gravel subsoil |
| 19 Experiments with and without Superphosphate | 40 Mechanical composition of soils well adapted for Wheat |
| 20 Crop of Oats. Yield of experiments with various manures on (1) Clay Soil. (2) Soil rich in Humus | 40* Mechanical composition of soils well adapted for Potatoes |
| 21 Crop of Oats and Barley. Yield of experiments with and without Phosphoric Acid on Clay Soil | 50 Poor Clay Country. Roads wide but not all made up. Hedges and Gates not well kept |

The following list of Slides &c., has been compiled by Sir E. J. RUSSELL, of Rothamsted Experimental Station.

The material is selected from books entitled "Soils and Manures," by Sir E. J. RUSSELL; "Manuring for Higher Crop Production," by Sir E. J. RUSSELL; "The Rothamsted Experiments," by A. HALL and Sir E. J. RUSSELL.

- | | |
|---|--|
| 36 Tomatoes growing on a light sand with varying food supply. Pot 47, Without Manure. Pot 55, One Dose of Manure. Pot 63, Two Doses of Manure | 44 Crop Map and Isotherms of Great Britain |
| 37 Tomatoes grown in good soil, all equally manured but receiving different quantities of water. Pot 17, No Water added. Pot 19, 5 per cent, added and the moisture then kept constant. Pot 21, 10 per cent, added and the moisture then kept constant. Pot 24, 12½ per cent, added and the moisture then kept constant | 45* Carrots grown on various types of soil |
| 38 Tomatoes grown in soil receiving successively increasing doses of manure in pots. Passing from left to right: Pots 3, 5, and 7, no manure. Pots 36, 38, 39, ten doses of manure. Top row, moisture maintained at 5 per cent. Middle row, moisture maintained at 10 per cent. Bottom row, moisture maintained at 12½ per cent | 46 Chalk Subsoil. This land can be cultivated although the soil is thin |
| 39 Curves shewing weights of crop produced with varying supplies of water and 0.01 and 0.02 grams of nitrate of soda per pot | 47 Gravel Subsoil. This land cannot be cultivated because the soil is too thin for a gravel subsoil |
| 40 Dongas in South Africa caused by heavy rainfall | 48 Mechanical composition of soils well adapted for Wheat |
| 41 Alkali Spot. Fremont, Nebraska | 40* Mechanical composition of soils well adapted for Potatoes |
| 42 Treeless Prairie. First Stage of Development | 50 Poor Clay Country. Roads wide but not all made up. Hedges and Gates not well kept |
| 43 " " Last (An Experimental Farm) | 51 Effects of Fertilisers on Sedges. Pot 1, complete manure—phosphates and nitrogen compounds. Pot 3, incomplete manure—phosphates and potash, but not nitrogenous compounds. Pot 5, no manure |
| * Denotes that full details are shown on the Slide. | 52 Effect of Potassic Fertilisers on Mangolds. Left-hand Plot, superphosphates and nitrogenous manure, no potassium salts. Right-hand Plot, superphosphates, nitrogenous manure, and potassium salts |
| | 53 Curves shewing effect of Farmyard Manure on Water Content of Soils. |
| | 54 The loss in making Farmyard Manure is much reduced by keeping the animals under cover |

EFFECT OF MANURES—Continued.

- 55 If enough yard space is not available, part of the Dutch barn may be used
 56* Effects of Storage of Farmyard Manure on yield of Potatoes
 57* Losses of nitrogen from Cow Manure stored loosely
 58 Worst way of storing Dung. Open to wind and rain
 59 Useful type of Dungstead for Dairy Farms
 60 Good Hay Plants. If the herbage is mainly like this, and in addition there is a good deal of clover, it is proof that the conditions are satisfactory
 61 Poor Hay Plants. Signs that something is wrong. Yorkshire fog indicates wetness or sourness, downy oat and quaking grass indicate poverty
 62 Good Pasture Plants. Showing that conditions are satisfactory
 63 Poor Pasture Plants indicating that the conditions are not good. Rush indicates wetness, Bent indicates unsuitability for root development, Hawkbit and Trefol show poverty
 64* Effect of Artificial Manures on yield and composition of hay
 65* Effect of Slag on Grass Land, &c.
 66* Average Increase in live weight of Sheep, &c.
 67* Broadbalk Wheat
 68 Comparison of Nitrate of Soda and Ammonium Salts on Wheat
- 66* Wheat. Broadbalk yield. Comparison
 70* Barley. Total produce showing residual effect of Dung and no Manure in relation to the dunged plot
 71* Effect of Mineral Manures on yield of Barley
 72* Mangold. Effect of various Mineral Manures
 73* " " Effect of addition of Mineral Manure to Dung with various Nitrogenous Cross Dressings
 74* Effect of the various Mineral Constituents with and without Nitrogen on the produce of Hay per acre
 75* Effect of Nitrogenous Manures on produce of Hay per acre
 76* Comparative effect of Clover or Bare Fellow on the succeeding crops in rotation
 77* Crops grown in rotation. Relative yield on Manured and Unmanured Plots in the earlier and later years of the Experiment
 78 Liming of Land.
 79 Table—Application of Manures.
 80 Varying Quantities of Manures.
 81 Sainfoin in Sand. Experiment.
 82 " " Details of roots.
 83 Table. Digestibility and Manure Values.
 84 Pit Experiment with White Clover.
 85 Clover Dodder.

*Denotes that full details are shown on the Slide.

B C**POTATO DISEASE.**

Beautifully Painted, 6s. 6d.; Plain Photographs, 2s. each.

The first four slides in this set are direct photographs of experiments made by the Warminster County Councils.

- 1 Plot of Potatoes, October, 1892, sprayed with Sulphate of Copper and Lime Dressing, 160 gallons to the acre, in July and August
 2 Plot of Potatoes, October, 1892, not dressed
 3 1 Perch of Potatoes (Imperators), half perch dressed, and half perch not dressed, October, 1892
 4 Heaps of Potatoes, showing actual results of above experiments. Dressed, 209 lbs., Undressed, 177 lbs.
 5 Sections of diseased and healthy Potatoes, and surfaces of diseased and healthy leaves
 6 Fungus on Leaf, *Peronospora infestans*. Vert. Sect.

ADDITIONAL SLIDES.

Messrs. NEWTON will send particulars of 24 supplementary slides on Potato Disease. The slides have been prepared from a series of new and original negatives.

B E**NITRIFYING ORGANISMS IN SOILS.**

Plain Photographs, 2s. each.

Photo-Micrographs by Prof. S. Winogradsky, of St. Petersburg.

- 1 Nitrous organism in soil from Zurich (Zoogloea stage) X 1,000
 2 Nitroso organism in soil from Zurich (Zoogloea stage) X 1,000
 3 Nitroso organism in soil from Zurich (mobile stage) X 1,000
 4 Nitroso organism in soil from Java X 1,000
- 5 Nitrous organism in soil from Java (mobile stage), X 1,000
 6 Nitroso organism in soil from Kazan Russia X 1,000
 7 Nitroso organism in soil from Gennenvilliers (grown on oilied jelly) X 1,000
 8 Nitroso organism in soil from Quito (Coccus), X 1,000
 9 Nitroso organism in soil from Quito X 1,000
 10 Nitroso organism in soil from St. Petersburg
 11 Nitroso organism in soil from Bonn

B X Z THE MANUFACTURE OF CHILEAN NITRATE OF SODA.

Messrs. NEWTON are indebted to the Chilean Nitrate Committee for permission to publish an interesting set of Slides visualizing the varied stages from the opening up of the Nitrate Fields and the different processes through which it passes in the factory to the shipment of this useful fertiliser to all parts of the world.

Plain Slides, 2s. each.

B F O**THE NORWEGIAN NITRATE INDUSTRY.**

Illustrating the production of Nitrate of Lime.

Printed Notes can be supplied with the Slides.

Full details of the above two sets will be found in "Industries," Section 7 of this Catalogue

For other sets of Slides published by kind permission of the Chilean Nitrate Committee see p. 210.

B O**FRUIT TREE CULTIVATION.**

The following photographs were taken by the kind permission of Mr. Francis Rivers, at his Nursery, Sawbridgeworth.

Beautifully Painted, 6s. each. Plain Slides, 2s 3d. each.

1 Grafting, Stock, Graft, Graft Cut, Graft inserted in Stock	12 Diagonal Trained Pear in Fruit
2 Budding, Stock, Bud cut for inserting, Bud inserted, Bud tied in	13 Horizontal Trained Pear Tree
3 Pruning, Pyramid Pear Tree	14 Fan Trained Plum
4 Maiden Cherry, 1 year old	15 Upright Trained Apple, 5 Branches
5 Maid'n Pnium, 2 years old	16 Pyramid Apple Trees in Fruit in Pots
6 Maiden Pear Tree	17 Standard Apple, 3 years old
7 Pyramid Pear	18 " Pear "
8 " in Fruit in Pot	19 " Plum "
9 " Pears, "Conference" and "Pitmasther Duchess"	20 Peach Trees, one year, pruned; and two years after pruning
10 Bush Pear in Fruit	21 Pyramid Peach grown in pot, 20 years old with 120 Peaches on it
11 Goblet-shaped Pear Tree in Fruit	22 Half Standard Peach
24 A Cluster of Red Gooseberries	23 Bush Peach in Fruit
25 A Cluster of Green smooth Gooseberries	28 A Cluster of Cherries
26 A Cluster of Yellow Gooseberries	29 A Cluster of Apples
27 A Cluster of Morello Cherries	30 A Sprig of Edible Chestnut Fruit

BFI**THE FRUIT FARMING INDUSTRY.**

Coloured Slides, 6s. 6d. each. Plain Slides, 2s. each.

By kind permission of Messrs. Chivers & Sons, Ltd., Heston, Cambridge.

1 Pumping solution for spraying Orchards	5 Picking Raspberries
2 Spraying Fruit Trees	6 Picking Currants
3 Spraying Fruit Trees. (Near view)	7 Picking Greengages
4 Bedding down Strawberries. (Straw)	8 Weighing in Fruit
By kind permission of Messrs. Wilkins & Sons, Ltd., Tiptree, Essex.	
9 Spraying Currant Bushes	13 Picking Cherries
10 Motor Plough	14 Picking Strawberries
11 Morello Cherry Orchard in bloom. Brook Hall Farm	15 Loganberry Plantation
12 Morello Cherry Tree	16 Picking Loganberries
	17 Weighing in fruit

BYW**FRUIT CULTURE.**

A Series of 50 Slides.

Coloured Slides, 6s. Plain Slides, 2s.

Full particulars on application.

For Slides on the Sugar Industry, see "Industries," Section 7 of this Catalogue.

BFT **FRUIT FARMING BY NEW ZEALAND METHODS.**

Beautifully Coloured Slides, 6s. each. Plain Slides, 2s. each.

1 Table. Distance Apart	29 Bud rightly pinched, etc.
2 Diagram. Square Method	30 Method of cutting branches
3 " Hexagonal System	31 Apple Canker
4 " Square System	32 " Scab
5 " Planting Board	33 " Mildew
6 " Method of using a planting board	34 " Brown rust
7 Heating a small home orchard with fire pots in full blaze	35 " rot
8 Red Clover in an orchard to be ploughed under	36 Keep Orchards free
9 Methods of layering Filberts and Cobs	37 Apple Oyster Shell Scale
10 Right ways of layering strawberries	38 " Codlin Moth and its work
11 Strawberry plant at stage for increasing runners	39 " Stages in the formation of sphaeropsis limb cankers
12 Correct cultivation	40 Powdery mildew on leaves
13 Whip or Tongue grafting young trees	41 Pear Leaf Blister Mite
14 Propagation of young trees. Budding and root grafting	42 Rust
15 Trained Apple Tree cut back and grafted	43 " Plum and Cherry Saw Fly
16 Rind grafting, etc.	44 " Mussel Scale
17 Double grafting	45 Peach Leaf affected with "Curl"
18 Bud properly inserted in stock	46 Spraying. First Application
19 Shield budding etc.	47 " Second "
20 Removing piece of wood from back of bud, etc.	48 " Third "
21 The objects of pruning	49 " a tree "
22 Apple Tree. 3rd Winter Pruning	50 Cultivating
23 Pruning 1 and 2 year old Apple Trees. Five examples	51 Irrigating
24 Summer pruning of shoots at end of Branches	52 A fine young Orchard—well irrigated
25 Pruning young gooseberry bush	53 Practical Western Orchard Cultivation
26 Typical summer shoots of pear tree, etc., Six examples	54 Lemon Tree
27 Showing the depth at which cuttings of bush fruits are inserted	55 Orange Ranch
28 Wood branch Extension	56 Seedling Oranges
	57 Gathering Oranges
	58 Spring time in an orchard
	59 Some Ducks in an orchard
	60 Raspberry Canes Three examples
	61 North-west special boxes for fruit

B V V

FARMING AND FRUIT GROWING UNDER THE SOUTHERN CROSS.

Beautifully Coloured Slides, 7s. 6d. each. Plain Slides, 2s. each.

- | | | |
|--|--|---|
| 1 Typical Bush | 32 A Bunch of Peaches. | 60 Interior of Freezing Works, Mutton. |
| 2 Bush Clearing. | 33 Black Grapes. | 61 Herd of Cattle. |
| 3 New Settlers. | 34 Pine Apple Field. | 62 Freezing works. Beef, Killing room. |
| 4 A Young Settler. | 35 Fruit Drying Green. | 63 Freezing works. Slaughter house. Capacity 3,500 per day. |
| 5 Making a start. Soldier Settler's first home. | 36 Fruit Drying on racks. | 64 Freezing works. Beef Department. |
| 6 A Happy Family. | 37 Stemming and Grading Machine. | 65 Freezing works. Tallow House Vats. |
| 7 Ploughing" with Tractor. | 38 River Steamer Loading Dried Fruits. | 66 Cooling room in Freezing works. |
| 8 Wheat stacked. | 39 Honey Grading. | 67 Store room for frozen Lamb and Mutton. |
| 9 Gathering the Wheat. | 40 Export of Apples. The Store. | 68 Classing wool and Rolling. Fleeces in a Shearing Shed. |
| 10 Threshing Scene. | 41 " " " Hoisting on ships. | 69 Carting Wool. |
| 11 A Well-to-do Fruit Grower's Home and Orchard. | 42 " " " Stowing in the hold. | 70 Delivering Wool at stores. |
| 12 Orchard and House of an Apple Grower. | 43 A Sheep Station. | 71 Packing Wool into Bales. |
| 13 Clearing Land for Orcharding. | 44 Sale of Sheep. | 72 Wool Stores |
| 14 Making Irrigation Channel. | 45 Types of Sheep. Romney flock. | 73 Jersey Milkers |
| 15 Ten year old Orchard. | 46 Specimens of Romney flock. | 74 Milking Herd. |
| 16 Stone Fruit Orchard. | 47 South Down. Ewes and Lambs. | 75 Calves on a Dairy Farm. |
| 17 Orchard (Stone Fruits) among the Mountains. | 48 Dipping Sheep. | 76 Typical Dairy Factory. |
| 18 A Fruit Orchard in the plains. | 49 Sheep feeding in Turnip Field. | 77 Receiving and weighing Milk at a Butter factory. |
| 19 Apricot Orchard. | 50 Sheepards leaving Station for mustering. | 78 Exterior of up to date Milking Shed. |
| 20 Extensive view of Orchards. | 51 Sheep crossing a stream. | 79 Machine Milking. |
| 21 Orchard and Vineyard. | 52 Mustering Sheep on the Plains. | 80 Testing Milk for butter fat. |
| 22 Apple Orchard. | 53 Mustering Sheep in the Hills. | 81 Condeusing and Pasteurizing Plant. |
| 23 Fruit growing. | 54 After Mustering, on the way to the station. | 82 Interior of Cheese Factory. |
| 24 Cherry Orchards. | 55 Drafting Sheep. | 83 Grading Butter. |
| 25 Almond Blossoms. | 56 Wallshed and Sheep yards. | |
| 26 Spraying Operation in an Orchard. | 57 Shearing in full swing. | |
| 27 Pickers at work in an Orchard. | 58 Wool Shed and Shorn Sheep. | |
| 28 Picking Grapes. | 59 Freezing Works and Sheep. | |
| 29 Grape Picking. | | |
| 30 Strawberry Picking | | |
| 31 Cherry Trees in bloom. | | |

B K

HOPS AND HOP CULTURE.

Photographs from Life.

This interesting Series of Pictures illustrating Hop Cultivation was Photographed at Brenchley by Mr. T. E. Freshwater, F.R.P.S., with the courteous assistance of H. Monson, Esq., of the South-Eastern Agricultural College, Wye, Kent.

Beautifully Painted Views, 6s.; Figures, 10s.; Plain Photographs, 2s. each.

The Plant.

- 1 Hops. Fuggles Goldings
- 2 Fuggles Goldings
- 3 Hops trained on the upright system on Poles (the one method)
- 4 Hops trained on slanting string and horizontal wires

Implements used for Culture

- 5 The Ploughs
- 6 " Hop Washer
- 7 " Sulphurator
- 8 Hoes

Spring and Winter Work.

- 9 Hop Netting put up to shelter the hops
- 10 Alley struck up
- 11 Feeding and pigs making dung
- 12 Washing Hops
- 13 Sulphuring Hops

Arrival of Hop Pickers.

- 14 Huts for the Pickers
- 15 Pickers in experimental plot A
- 16 " In Plot B
- 17 " " C
- 18 " " D
- 19 "

- 20 Children resting
- 21 Dog wat-hing the Pokes
- 22 Pole-puller
- 23 Hop Bin
- 24 Measuring Hops out of the Bin
- 25 Tallying Hops
- 26 Weighing Hops from the experimental plot
- 27 Loading Wagon
- 28 Waggons arriving at the Oast House
- 29 Hops put on the Rack ready for next drying
- 30 The old Oast House with open fireplace
- 31 " new " " Cookies" furnace
- 32 Drying, filling, and pressing room in the Oast
- 33 Hop Sample and Mate drawing samples
- 34 Hops being loaded into trucks at the station
- 35 Hop Garden stripped
- 36 Poles stacked
- 37 Hop Garden with permanent poles and wire work

Diseases

- 38 Hop Aphis (green fly) *Aphis Annuli*. Pups at early stage, also showing wing cases. Male Aphis, Female, wingless form

- 39 Red Spider

- 40 Mould

- 41 Insect in fungus

Remedial Substances.

- 42 Quassia. Splitting logs for Quassia chips

[For Slides on "Brewing" see "Industries," Section 7.]

B P THE LIFE OF THE WHEAT PLANT FROM SEED TO SEED.

Photographed by special permission from a series of diagrams published by the Royal Agricultural Society of England.

Plain Photographs, 2s. each, Descriptive pamphlet, 6d.

- 1 The Structure of the Grain. (1) The grain X 6 times. (2) Embryo of 1 exposed, X 6 times. (3) Section of 1, X 6 times. (4) Transverse section of 1 through endosperm, X 6 times. (5-6) Transverse section of 1 through the Embryo, X 6 times.
- 2 The Structure of the Grain. (7) Section of part of a grain showing the stored gluten and starch, X 120 times. (8) Starch grains, X 510 times.
- 3 Germination of the Grain. (1) Grains so on 3 days, X 4 times. (2) Section of 1, X 6 times. (3) Grain sown 5 days, X 4 times. (4) Section of 3, X 6 times. (5) Grains sown 8 days, X 4 times. (6) Section of 5, X 8 times.
- 4 Germination of the Grain. (7) Section of the leaf and sheath of 5, X 30 times. (8) Section of piece of leaf of 7, X 120 times. (9) Stems and stamens of leaf, X 120 times. (10) Section of root of 5, X 40 times.
- 5 The Young Plant. (1) First leaf emerging, $\frac{1}{2}$ natural size. (2) Figure 1, X 4 times. (3) Section of part of Fig. 2, X 6 times. (4) Young plant with a second leaf, $\frac{1}{2}$ natural size. (5) Section of part of Fig. 4, X 6 times.
- 6 The Young Plant. (6) Young plant with 3 leaves, $\frac{1}{2}$ natural size. (7) Part of 6, X 3 times. (8) Section of 7, X 6 times. (9) Section of root with young rootlets, X 10 times.
- 7 Early growth of the Ear. (1) Plant, March 21, $\frac{1}{2}$ natural size. (2) Plant, April 24, $\frac{1}{2}$ natural size. (3) Lower part of 3, X 8 times. (4) Section of 4, X 8 times.
- 8 Early growth of the Ear. (2) Centre of stem of 1, with young ear, X 16 times. (6) Section of stem of 3 with young ear, X 16 times. (7) The ear, April 28, X 16 times. (8) 1^h ear, May 5, X 16 times. (9) Ear, May 12, X 16 times.
- 9 Growth of the Ear and Flower. (1) The ear, May 19, X 8 times. (2) The ear, May 26, X 8 times. (3) The ear within its sheath. (8) The ear emerging from sheath, June 16, $\frac{1}{2}$ natural size.
- 10 Growth of the Ear and Flower. (4) Spikelet of 8, X 4 times. (6) Spikelets taken from an ear, June 29, X 4 times. (8) Spikelet of 8, X 4 times.
- 11 Growth of the Ear and Flower. (5) A flower of 4, X 8 times. (7) A flower of 6, X 8 times. (10) A flower of 9, X 8 times. (11) The same flower (10) showing the young grain, X 6 times. (12) Section of Anther of 10, with ripe pollen, X 10 times. (13) Section of young grain of 11, X 10 times.
- 12 The Flower. (1) Ear in flower, June 20, $\frac{1}{2}$ natural size. (2) Another view of 1, $\frac{1}{2}$ natural size. (3) Spikelet of 1, X 2 times. (4) A flower of 3, X 2 times. (5) The same flower (4) without the glume, X 2 times. (6) Section of glume and pale of 4, X 2 times.
- 13 The Flower. (7-8) Flower with lodicules, stamens and style, X 4 times. (9) Section of a lodicule of 7, X 6 times. (10) Transverse section of a burst Anther, X 8 times. (11) Ovary and style with pollen grains, X 4 times. (12-13) Section of 11, X 8 times. (14) Transverse section of ovary of 11, X 8 times. (15) A hair of the style of 11, X 80 times. (16) Pollen grains, entire, emitting the tubes and empty, X 80 times.
- 14 Ripening of the Grain. (1) Grain, June 20, X 5 times. (2) Embryo of 1 exposed. (3) Section of 1 through the Embryo. (4) Grain, June 26, X 5 times. (5) Embryo of 4 exposed, X 5 times. (6) Section of 4 through the Embryo, X 5 times. (7, 8) Embryo of 4 detached, X 8 times.
- 15 Ripening of the grain. (9) Nearly ripe grain, X 5 times. (10) Embryo of 9 exposed, X 5 times. (11) Section of 9 through the Embryo. (12) Fully ripe grain, X 5 times. (13) Embryo of 12 exposed X 5 times. (14) Section of 13 through the Embryo, X 5 times. (15) Section of the Embryo of 12, X 5 times.
- 16 The Wheat Straw. (1) The Wheat Plant in flower, $\frac{1}{2}$ natural size. (7) The plant in seed, $\frac{1}{10}$ natural size.
- 17 The Wheat Straw. (2) Portion of the straw of 1, $\frac{1}{2}$ natural size. (3) Section of 2, X 4 times. (4) Section of 2, X 8 times. (5) Section of 3 at the knot, X 8 times. (6) Section of 4, X 80 times. (7) The plant in seed, $\frac{1}{10}$ natural size.

B Q

THE LIFE HISTORY OF WHEAT.

Direct Photo-Micrographs, 2s. each.

- 1 Wheat Plant Stem. Trans. section, stained
- 2 " Long. section of one-half, stained
- 3 " Root. Trans. section, stained
- 4 " Leaf
- 5 " Siliceous Cuticle
- 6 " Fruit. Long. section of embryo, stained
- 7 " Plant Fruit. Trans. section of Endosperm, stained

- 8 Wheat Plant Starch. Isolated
- 9 Smut in Grain of Wheat. *Ustilago segetum*
- 10 Mildew on Stem of Wheat. *Puccinia graminis*
- 11 Spores of Bunt Fungus in Corn. *Uredo foetida*
- 12 Wheat Stem Fly
- 13 Eel Blight from Wheat. *Vibrio tritici*
- 14 Meal Mites. *Tyroglyphus farinae*

For Slides on "Bread Making" and on "London Docks," see "Industries," Section 7

B A

AGRICULTURAL BOTANY.

Direct Photo-Micrographs, 2s. each.

Roots.

- 1 Growing Tip of Root of Barley, long. sect.
- 2 Trans. Sect. Root of Maize, showing root hairs.
- 3 Trans. Sect. Root of Maize, showing branching
- 4 Trans. Sects. Root, Emerging Turnip.
- 5 Trans. Sect. Stem of Host, showing sucker roots of Dodder Cuscusa Trifolia.

Stems.

- 6 Trans. Sect. Stem of Oat.
- 7 " Bean.
- 8 Long. Sect. Stem of Bean.
- 9 " a Bud of Lime Tree
- 10 Vert. Sect. of Leaf (a) Bean.
- 11 Vert. Sect. of Leaf (b) Oat.
- 12 " of Leaf (c) Cabbage white

Leaf.

Flowers.

- 13 Trans. Sect. of an Anther.
- 14 " of an Ovary of Potato.
- 15 Vert. Sect. of a grain of Oat, showing Embryo and Endosperon.
- 16 Trans. Sect. of Cotyledon of Pea
- 17 Embryo of Oat, Trans. Sect.
- 18 Seed of sweet Vernal Grass.

Fruits and Seeds.

AGRICULTURAL BOTANY—(Continued).

General Structure.

- 19 Long. Sect. Stem Lettuce, to show milk tubes.
- 20 Sect. stem Vegetable Marrow to show sieve plates.
- 21 Epidermis of leaf of grass, to show stomata.
- 22 Stinging hairs of nettles.

- 23 Section of Potato, cells containing starch and cork cells of rind.
- ucci nia Graminis in Stages.
- 24 (a) Rust.
- 25 (b) Mildew on Stem of Wheat.

- 26 Barberry *Accidium Berbideres*.
- 27 Club Root in Turnips, showing enlargement of cells.
- 28 Ergot of Rye, *Claviceps purpurea*.
- 29 Smut of Wheat, *Ustilago Segis*.
- 30 Potato Disease, Fungus on leaf, *Peronospora infestans*

A Z

ELEMENTARY BOTANY.

Copied from Pictures by permission of Messrs. Longmans & Co.

Arranged by F. Timbrell, Esq., A.K.C.

Text Books, Thome's Botany, 4s.; Edmond's Botany, 4s.
Beautifully Painted, 6s.; Plain Photographs, 2s. each.

THE ROOT.

- 1 Varied forms assumed by Root
- 2 Its endogenous nature, its cap and hairs
- 3 Development in a mono-, and a dicotyledon
- 4 and 5 T.S. (two) of Ranunculus acris, showing the centripetal formation of wood

THE STEM.

- 6 Subterranean and prostrate forms
- 7 Diagram of dicotyledon
- 8 " monocotyledon
- 9 T.S. of dicotyledon
- 10 L.S.
- 11 T.S. of monocotyledon
- 12 " " Dracena, showing formation of new vascular bundles from extra fascicular cambium

THE LEAVES.

- 13 Simple entire
- 14 " divided } Types of leaves
- 15 Compound
- 16 Particular forms of leaf

- 17 Arrangement of leaves on stem
- 18 T.S. through stomata into intercellular spaces
- 19 Activation
- 20 Vernation

THE FLOWER.

- 21 Perfect, pistillate, staminate, and neuter flowers
- 22 The floral diagram
- 23 The calyx, various form of
- 24 " corolla "
- 25 " stamen "
- 26 " pollen "
- 27 " pistil "

THE FRUIT.

- 28 The floral diagram

- 29 The calyx, various form of

- 30 Sunflower Root, trans. sect. stained

- 5 Hop stem, trans. sect.

- 6 Bean Plant Stem, one half of an inter node, trans. sect.

- 7 Clematis, Section

- 8 Pitcher Plant Stem, trans. sect.

- 9 Gipsey-wort, trans. sect. (Isoc.)

- 10 Virginia Creeper, Stem, trans.

- 11 Cycad, Structure of Stem, trans. sect.

- 12 Marestail, Section of Stem

- 13 Alspice Stem and Leaf

- 14 Date Palm, trans. sect.

- 15 Bamboo Cane, stem

- 16 Rastan Cane ratang, trans. sect.

- 17 Palm, trans. sect.

- 18 Hazel, trans. sect. of Branch

- 19 Orange Tree, Stem of, trans. sect

- 20 Pine, Bristlecone, trans. sect.

- 21 Tree Fern, trans. sect. [Stem

- 22 Spruce Fir, abies, trans. sect. of Stem

- 23 Elm, structure of

- 24 Stem, Arborescent Dicotyledon, trans. sect.

- 25 Pine, Structure of Stem, trans-

- 26 sive tristis. Stem of Pinus

- 27 sylvestris

BOTANICAL SLIDES.

A series of Photomicrographs.

Plain Slides, 2s. each.

- 25 Lime Tree, longitudinal and trans. sect.
- 26 Lime Tree, trans. sect.
- 27 Holly Ilex, trans. sect.
- 28 Mulberry, trans. sect.
- 29 Oak, trans. sect.
- 30 Cedar, Section of Wood Pencil
- 31 Rosewood Sections
- 32 Barberry, trans. sect. of Stem
- 33 Aristolochia, trans. sect. of wood
- 34 Lime, Stem of trans. sect. 2 years old
- 35 Mulberry, longitudinal sect.
- 36 Oak, longitudinal sect.
- 37 Pasiflora Cerulia, trans. sect. of Stem
- 38 Ficus Serratus, trans. sect.
- 39 Cycas Revoluta
- 40 Daucus Carota, trans. sect.
- 41 Hop, Leaf stalk, trans. sect.
- 42 Fern, Structure of Stem, t.s.
- 43 Rhubarb, Spiral fibre Stem of
- 44 Chrysanthemum, trans. sect. young shoot
- 45 Hop Leaf, trans. sect. through midrib
- 46 Male Fern, Lastria Filex-mas, trans. Sect.
- 47 Brake Fern
- 48 Maidenhair Fern Pinnule
- 49 Raspberry Leaf, showing the veins
- 50 Ficus Elastica, T.S. of leaf showing Cystolith in situ
- 51 Fern, Frond of
- 52 Flowers, trans. sect. of Anther
- 53 Sweet Flag Flower, trans. sect., very rare
- 54 Poppy, Flower-bud
- 55 Lilium Auratum, Bud, trans. sect. showing various parts in situ
- 56 Tulip, Three-celled ovary, trans. sect.
- 57 Tulip, trans. sect. of ovary Generiana
- 58 Lilium, Ovary of, trans. sect. showing Embryo Sac
- 59 Great Butterfly Orchis, trans. sect. of ovary
- 60 Maple, Flower bud
- 61 Deadly Nightshade, *Acosmone*
- 62 Cactus Flower and Fruit
- 63 Hylanthus annuus, Bud
- 64 Oats
- 65 Wheat
- 66 Barley
- 67 Pteris Aquilina, Rhizome
- 68 " " T.S. of Stem
- 69 Foxglove, T.S. of Ovary
- 70 " L.S. [Stem
- 71 Pepper (*Rubus Nigrum*), T.S. of

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1 Slide illustrating the Divisions of the Phanerogamous Plants, Gymnosperms and Angiosperms.

ROOT.

2 Root Cap (pileorhiza).

6 Forms of Roots, Fibrous, Nodulose.

3 Root Hairs.

7 Biennials.

4 Root of Bean and Oats (germinating).

8 Aerial Roots of Orchids.

5 Modes of Germination as exemplified by Pinus, Date, Mais, Oak, Beech.

9 Roots of Dahlia, Orchids, &c.

STEM.

10 Stem of Labiates, &c.

15 Tendrils.

11 Runners, Stolons.

16 Tufted Vetch (V. Craggas).

12 Rhizomes (Solomon's seal).

16 Spines.

13 Tubers.

17 Prickles and Hairs.

14 Bulbs and Corms.

17a Fasciated Stem (Cockscomb).

14a Orchid with bulbiferous stem.

LEAVES.

18 Seed Leaves, Radical and Cauline.

31 Mountain Tri-ternate Leaf of Rue.

19 Evening Primrose, illustrating Foliage Bracts, and Floral Leaves.

32 Slide exhibiting unequal symmetry of Leaves (Begonia, Elm and Laurel).

20 Simple Entire Leaves (Iris, Plantain, Lilac, Sessile).

32a Begonia.

21 Simple Petiolate.

33 Slide showing development of divided Leaves from entire.

22 Lobed Leaves (Sycamore, Maple, Ivy).

34 Oak.

23 Lobed Leaf compared with Compound Leaf.

35 Decurrent Leaves and Modifications of Xanthoxylon.

24 Mustard, Dulcamara, Dandelion.

36 Thistle and Sweet Pea.

25 Palmatisect and Pinnatisect Leaves.

37 Connate Leaves (Honeysuckle and Claytonia).

26 Pedate Leaf of Helleborus.

38 Connate Chlora perfoliata.

27 Compound Leaf of Laburnum, Bramble, and Strawberry.

39 Connate Teasels.

28 Compound Leaf of Orange, Cinquefoil, Potato, Mountain Ash.

40 Climbing Leaf of Clematis.

29 " Mountain Ash, Pari-pinnate, Imparipinnate, and Bi-pinnate.

41 Juniper and Pinus (Leaves of Conifers).

30 " Mountain Ash, Digitate Leaves of Horse-Chestnut and Virginian creeper.

42 Succulent Leaves of Aloe.

43 Succulent Euphorbia.

LEAF AND BRANCH MODIFICATIONS.

44 Asparagus.

46 Cladodes of Xylophylla.

45 Cladodes of Butcher's Broom and Phyllodes of Grass Vetch.

46a Cladodes.

STIPULES.

47 Leaf Sheath of Heracleum (Spiny Stipules of Robinia).

50 Slides exhibiting Parenchymatous and Prosenchymatous Tissue.

48 Stipules of Viola, Rose, Mealianthus, Pisum, and Geum.

51 Berberis.

49 Sweet Pea, Lathyrus Aphaca, Pyrus Japonica, and Hawthorn.

52 Latice Plant.

INSECTIVOROUS PLANTS (LEAF MODIFICATION).

53 Venus Flytrap.

59 Cactus Spines.

54 Sun Dew (Drosera).

60 Barberry and Crataegus (Hawthorn).

55 Sarcocenia.

61 Sloe, Hawthorn, Gooseberry, and Rose.

56 Nepenthes (Pitcher Plant).

62 Tendrils of Pepper and White Bryony, showing leaves modified.

57 Group illustrating various shapes of simple leaves.

63 Slide exhibiting Phyllotaxis.

58 Group of Raspberry Leaves, exhibiting development of Quinate Leaf from Ternate leaf.

64 Group of Parasitical Plants.

ELEMENTARY BOTANICAL SLIDES—Continued.

BRACES.

- 65 Euphorbia, Compositae, Umbelliferae, and Valonia. | 66 Bougainvillia.
67 Lime.

INDEFINITE INFLORESCENCES.

- | | |
|---|-------------------------------------|
| 68 Spike, Plantain, Wheat, Barley,
69 Verbenae and Rush. | 73a Digitalis. |
| 69a Spike of Orchids. | 73b Honeysuckle. |
| 70 Spadix. | 74 Panicle, Corymb. |
| 71 Amentum, Strobilus, and Cone. | 74a Corymb and Corymbose Cyme. |
| 72 Carpellatum, Hypanthodium. | 75 Panicle, Thyrus, Horse-Chestnut. |
| 72a (Alder, Birch and Pinus.) | 76 Umbel. |
| 72b Section of Hypanthodium. | 76a Axillary Inflorescences. |
| 73 Raceme (3 varieties). | 76b Herb Paris (terminal infl.). |

DEFINITE INFLORESCENCES.

- | | |
|----------------------------|----------------------------------|
| 77 Cyathes (3 varieties). | 79a Inflorescence of Heliotrope. |
| 78 Figwort. | 79b Comfrey. |
| 79 Verticillaster (mixed). | |

FLOWERS.

- | | |
|--|---|
| 80 Hermaphrodite, Staminate, and Pistillate.
Dichlamydaceous, Monochlamydaceous, and Achlamydaceous Flower. | 89 Example of Corona. |
| 82 Monoecious and Dioecious Flowers. | 89a Daffodil. |
| 83 Hypogynous, Perigynous, Epigynous Flowers,
Illustrating Thalamiflorae, Calyciflorae, Corolliflorae, or Gramopetalae. | 90 Rose (double flower) transformation of
Stamens. |
| 83a Fuchsia (dissected). | 91 Examples of Nectaries. |
| 85 Gametophalous Corollas (4 varieties). | 92 Grasses, Sedges, and Rushes. |
| 85a Papilionaceous Corolla. | 93 Stamens of Erica, Compositae, Leguminosae,
Malva, Fumitory Hypericum, Ricinus, and
Salvia. |
| 86 Flowers of Monocotyledon (Petaloidem) and
Dicotyledon. | 94 Pollen of Mallow. |
| 86a Wind fertilised Flower of Wheat. | 95 Pistil of Lily, Iris, and Eustoma. |
| 87 Slides (2) exhibiting flower adapted for cross
fertilisation. | 95a Iris. |
| 87a Campanula. | 95b Iris (dissected). |
| 87b Garden Nasturtiums. | 96 Dimorphic and Trimorphic Flowers. |
| 87c Fumitory. | 97 Section of Ovaries showing Placentation Unilocular and Multilocular Ovaries. |
| 87d Geranium Pratense. | 97a Garden Peas. |
| 87e Malva Sylvestris. | 98 Syncarous and Apocarpous Ovaries. |
| 88 Group of Compositae. | 98a Columbine (flower and fruit). |
| | 99 Slide exhibiting three forms of ovules. |

DEHISCENT FRUITS.

- | | |
|---|--|
| 100 Various forms of Capsules (Legume, Silique,
Silicula, Follicle, &c.) | 102 Slide illustrating the three common forms of
Dehiscence, Loculicidal, Septicidal, and
Septifragal. |
| 100a Rocket (Honesty). | |
| 101 Capsule of Primrose, Viola, Lychnis, Antirrhinum, Poppy. | |

INDEHISCENT FRUITS (SUCCULENT).

- | | |
|------------------------|-------------------------------|
| 103 Drupes, Drupelets. | 104a Modification of Berries. |
| 104 Berries. | 105 Sections of Berries. |

DRY INDEHISCENT FRUITS.

- | | |
|----------------------|--|
| 105a Schizocarps. | 109 Aril (Nutmegs—whole and dissected.) |
| 106 Cocoa Nut. | 109a Aril View. |
| 106a Samaras. | 110 Section of Albuminous and Exalbaminous
Seeds. |
| 107 Achenes, Nuts. | |
| 108 Spurious Fruits. | |

MICROSCOPICAL STRUCTURES (ENLARGED).

- | | |
|---|---|
| 111 Parenchymatous and Prosenchymatous Tissue. | 116 Stem of Elm, Helianthus, Hippuris. |
| 112 Laticiferous Tissue. | 117 Rush and Elder. |
| 113 Stomata. | 118 Roots of Bean, Dock, and Pinus. |
| 114 Slide showing stem sections of Pinus, Maize,
Dracaena and Bramble. | 119 Stem of Maize and Bramble. |
| 115 Fern Stem. | 120 Slide showing growth after the removal of the
Duramen. |

A few extra Slides (which are placed in their proper position and numbered a, b, &c.) have been prepared since the original preparation of this list, which tend to illustrate special points, thus bringing the total number up to 150.

AFO**BOTANICAL
PLANT ORGANS, SPORES, FERTILIZATION, &c.**

A new series of Photomicrographs from very carefully prepared specimens, showing the Spores, Cluster Cups, Conceptacles, Sexual Methods of Reproductions, Diatoms, &c.

Plain Slides, 2s. each.

- 1 Dividing nucleus in *Pinus*. Showing formation of the Nuclear Spindle.
- 2 Dividing nucleus in *Pinus*. Showing formation of cell plate which eventually forms a cell wall.
- 3 Dividing Nucleus in young Bean Root. T. Sec. of portion of young root of the bean showing Nucleus. Chromatin in filament dividing into V's.
- 4 Diatom: *Aulacodiscus Orientalis*. All the diatoms are placed in the series as representing plants which reproduce by division.
- 5 *Triceratium Favus*.
- 6 *Stamoneis Enicentrum*.
- 7 *Arachnoidiscus Ehrenbergii*.
- 8 The same, showing growth of connecting tubes before formation of Zygospores.
- 9 Same, more highly magnified.
- 10 *Spirogyra* in Conjugation, showing Zygospores and spiral filaments.
- 11 The same, showing Zygospores more highly magnified.
- 12 *Vaucheria*. Showing the growth of the new plant from the zoospore; also showing the oogonia and antheridia.
- 13 *Saprolegnia* growing on an Ant's Egg in water. Showing ends of filaments divided off and developing zooids.
- 14 Portion of the same more highly magnified.
- 15 Low power view of same.
- 16 Sexual method of reproduction showing the oospore being fertilised by the clasping antheridia.
- 17 Low power view of the same.
- 18 Reproductive Organs of Chara. Antheridioim and young *Carpogonium* of Chara *Fragilis*.
- 19 Reproductive Organs of Chara. Same, much older stage, both show the winding cells containing and enclosing the oospore.
- 20 Reproductive Organs of Chara. Same as No. 19.
- 21 Reproductive Organs of Chara. Bust Antheridium of Chara, showing the Manubria with Septate filaments attached containing the coiled antherozoids.
- 22 Male Concep. of *Fucus*. Section through the Thallus of *Fucus* showing Male Conceptacle. This shows the filaments as tree-like forms which produce the antherozoids and the orifice by which they escape.
- 23 Male Concep. of *Fucus*. Filaments highly magnified showing the contained antherozoids.
- 24 Female Concep. of *Fucus*. Section through Thallus of *Fucus* showing Female Conceptacle. This shows the Mother cells growing among the paraphyses, some of the former dividing up into daughter cells which form the oospores. The orifice is also shown by which they pass into the water.
- 25 Spores of Fungus (*Polyporus*). Section of Fungus (*Polyporus*) showing production of spores on the basidia.
- 26 Cluster Cups. Section through group of Cluster Cups on the Coltsfoot, showing the spores being produced. The mycelium can also be seen in places.
- 27 Apothecium of Lichen. Thallus and Apothecium of Lichen (fo iaceous), showing structure of the Thallus and Apothecium or spore-bearing organ.
- 28 Apothecium of Lichen. Section through the Apothecium of foliaceous Lichen showing the spores developing in the ascii.
- 29 Antheridia of Liverwort. Section through the Thallus of a Liverwort, showing the male organs, the Antheridia developing in the Antheridial receptacle.
- 30 Archegonia of Liverwort, *Marchantia Polymorpha* in situ.
- 31 *Marchantia Polymorpha*. L. Sec. of Receptacle of *Marchantia Polymorpha* showing the Archegonia in section.
- 32 Spores and Elaters of *Marchantia*.
- 33 Antheridia of Moss. Long. section through Moss Plant, showing the Antheridia (male organs) in situ.
- 34 Archegonia of Moss. Long. section of Moss Plant, showing Archegonia in situ among the leaves.
- 35 T.S. Capsule of Moss (*Polytrichum commune*). Transverse section, showing wall of the capsule, spore sac and columella in section.
- 36 Moss Capsule. Long. section of Capsule of Moss, showing Spore Cavity, Columella, &c.
- 37 Section through Prothallus of Fern, showing Antheridia in different stages of development.
- 38 Archegonia on ditto showing canal and egg cell.
- 39 Sec. through Sori of Fern, showing spore cases with their thickened border, the whole being covered over by the Indusium.
- 40 Fructification of *Equisetum*. Transverse and Long. Sec. of Sporophyll of *Equisetum* showing spore cases in situ.
- 41 Spore case of *Equisetum*. Long. Sec. through spore case of *Equisetum* showing spores in situ. It also shows extremely well the peculiar thickening of the cell walls of the spore cases by means of which the spores are dispersed.
- 42 Spores of *Equisetum* with the filaments coiled round them.
- 43 Spores of *Equisetum* with filaments expanded.
- 44 Sporophyll of *Lycopodium*. Long. Sec. of Sporophyll of *Lycopodium* (Club Moss), showing spores in situ, also the peculiar structure of the capsule wall where it ruptures at the top.
- 45 Ovuliferous Scale of Larch, showing the structure of the scale, its ovule, and the micropyle.
- 46 Ovuliferous Scale of *Pinus*. Long. Sec. of cone of *Pinus*, showing the scales with the Ovules at their base. The Ovules show the micropyle, &c., extremely well.
- 47 Ovule of Hyacinth. Long. Sec. of Ovule of Hyacinth, showing the Egg Cells, Antipodal Cells, and the Embryo-sac.
- 48 Anther of the Turks Cap Lily. Older stage. Trans. sec. of young Anther of the Turks Cap Lily, showing the Mother cells, dividing to form the Pollen Grains.
- 49 Anther of Turks Cap Lily. Young stage. Trans. sec. of Anther of the Turks Cap Lily, showing the structure of its various parts.
- 50 Long. Sec. of Embryo of Wheat showing all its different parts.

BOTANICAL PLANT ORGANS, SPORES, FERTILIZATION, &c.—Continued.

- 51 Development of Lenticel in the Elder. This section shows the Stomata only before the commencement of Cork formation.
 52 Development of Lenticel in Elder. Shows the formation of the spongy cells under the Stomata, and also the first beginning of the Cork.
 53 Fully developed Lenticel on Elder showing its structure and also the rapidly developing Cork layer.
 54 Leaf Fall Poplar. Long. Sec. through junction of petiole and stem showing the formation of the Ahscess layer which causes the leaf to fall.
- 55 Leaf Fall. Trans. Sec. through the Ahscess Layer in leaf of Horse Chestnut, which causes the leaf to fall in autumn, showing the corky layer forming.
 56 Trans. Sec. through Xylem of leaf of Pinus. Section through bordered pit showing the pores and central membrane.
 57 Long Sec. of Hop Stem with Trans. Sec. of Dodder Stem parasitic thereon. Shows the haustoria from the Dodder which has grown into the Hop Stem. It also shows very beautifully the spiral vessels in the Hop Stem.

A V A STRUCTURAL BOTANY, (FLOWERS).

From carefully-executed diagrams. The various parts are numbered and appear on the slides with the printed descriptions.

Plain Slides, 2s. each.

- | | |
|---|--|
| 1 Berberis vulgaris. | 11 Achillea millefolium and Chrysanth : leucanth : |
| 2 Cardamine pratensis. | 12 Cnicus arvensis. |
| 3 Viola carcarata. | 13 Hieracium umbellatum and H: pilosella. |
| 4 Dianthus deltoides. | 14 Campanula pusilla. |
| 5 Stellaria graminea. | 15 Erica tetralix. |
| 6 Malva silvestris, &c. (essential organs). | 16 Veronica chamaedrys. |
| 7 Erodium cicutarium. | 17 Digitalis purpurea. |
| 8 Sarothamnus scoparius. | 18 Euphrasia officinalis. |
| 9 Parnassia palustris. | 19 Pedicularis sylvatica. |
| 10 Anthriscus silvestris. | |

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|---------------------------------|-----------------------------------|
| 1 Root of Sunflower. Branching | 18 Stem of Hazel T.S. Formation |
| 2 Potato. Cork and Starch Cells | of wood |
| 3 Cork Cells | 19 Elder. Pith T.S. For- |
| 4 Root of Maize. Root Hairs. | mation of wood |
| 5 Root of Barley. Growing Tip | 20 Hop T.S. Formation of |
| 6 Duck-weed. Root Cap | wood |
| 7 Sucker Roots of Dodder on | 21 Rattan T.S. Forma- |
| Clover | tion of wood |
| 8 Stem of Elm. T.S. Formation | 22 Lime V. and T.S. For- |
| of wood | mation of wood |
| 9 " Bamboo T.S. Forma- | 23 Shoot of Lime V.S. Leaf |
| tion of wood | arrangement |
| 10 " Tree Fern T.S. Forma- | 24 Bud of Lily T.S. Leaf arrange- |
| tion of wood | ment |
| 11 Scalariform Cells of Fern. | 25 Stem of Deadnettle. Leaf |
| Formation of wood | arrangement |
| 12 Stem of Butcher's Broom T.S. | 26 Branch of Elm. Leaf arrange- |
| Formation of wood | ment |
| 13 " Male Fern T.S. Forma- | 27 Branch of Oak. Leaf arrange- |
| tion of wood | ment |
| 14 " Bracken T.S. Forma- | 28 Leaf of Lime. Leaf veining |
| tion of wood | 29 " Lily of Valley " |
| 15 " Buttercup T.S. For- | 30 " Hart's Tongue " |
| mation of wood | 31 Leaf Stalk of Hop T.S. |
| 16 " Bean T.S. Formation | 32 " Blade " T.S. |
| of wood | 33 " of Indiarubiae T.S. Cys- |
| 17 " Orange T.S. Formation | tolith <i>in situ</i> |
| of wood | |
| | 34 Stomata |
| | 35 Water Stomata |
| | 36 Leaf of Sundew |
| | 37 Pitcher Plant |
| | 38 Spathe of Arum |
| | 39 Bud of Lily T.S. |
| | 40 " Poppy V.S. |
| | 41 Stamen T.S. |
| | 42 Peppery Head |
| | 43 " T.S. |
| | 44 Bloom of Hydrangea |
| | 45 " Fuchsia |
| | 46 American Poplar |
| | 47 Black " |
| | 48 Maple " |
| | 49 Pollen Grains |
| | 50 " Germinating |
| | 51 Ovary of Lily T.S. |
| | 52 Sori of Fern |
| | 53 Prothallus |
| | 54 Fern Germinating |
| | 55 Cluster of Blackberries |
| | 56 Hawthorn |
| | 57 Hooked Fruit of Burdock |
| | 58 Winged " Maple |
| | 59 Feathered " Thistle |
| | 60 Pods of Laburnum |

See also an excellent lecture on " Trees, their forms and branching," page 231.

NOTE.—When ordering Slides the Telegraphic Code Letters should be quoted to avoid mistakes.

RN THE PRINCIPLES OF HORTICULTURE.

These Slides are photographed from the original drawings made for "The Principles of Horticulture" (by WILFRED MARK WEBB, F.L.S., &c., 2s. net. BLACKIE AND SON), and are admirably suited for giving a series of practical lessons in Botany.

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- 1 Diagram of Privet Leaf, illustrating method of labelling drawings.
- 2 Cress Seedling grown on blotting paper, to show Root-hairs.
- 3 Stem-hairs of Groundsel.
- 4 Chief parts of a Green Plant, and their functions.
- 5 Tissues in stem of Elder.
- 6 Old Stem of Vegetable Marrow, trans. section.
- 7 Old Thickened Root of Vegetable Marrow, trans. section.
- 8 Soft Bast of Vegetable Marrow, long section to show Sieve Tubes.
- 9 A Cell showing Vacuoles.
- 10 The Formation of a Wood Vessel.
- 11 Fruit of the Sycamore.
- 12 Half Fruit of Sycamore, opened to show Seed.
- 13 Contents of a Sycamore Seed.
- 14 Seed of Scarlet Runner, exterior view.
- 15 Seed of Scarlet Runner, dissected.
- 16 Embryo (Young Plant in a Seed).
- 17 Annotated Diagram, illustrating joint action of Root, Leaf and Stem.
- 18 Vegetable Marrow, enlarged Unthickened Root, plan of trans. section.
- 19 Vegetable Marrow, Thickening Root, 1st stage.
- 20 Vegetable Marrow, Thickening Root, 2nd. stage.
- 21 Vegetable Marrow, Young Thickened Root, enlarged plan of trans. section.
- 22 Young Branching Root of Stinging Nettle, as seen under the Microscope by Transmitted light.
- 23 Flower-stalk of Arum, trans. section.
- 24 Bud of Brussels Sprout, surface view of cut stem.
- 25 Bud of Brussels Sprout, long section.
- 26 Plan, showing arrangement of leaves in four rows, with $\frac{1}{4}$ circle (90 degs.) between them.
- 27 Plan, showing arrangement of leaves in two rows, with $\frac{1}{2}$ circle (180 degs.) between them.
- 28 Plan, showing arrangement of leaves in three rows, with $\frac{2}{3}$ circle (120 degs.) between them.
- 29 Plan, showing arrangement of leaves in five rows $\frac{3}{4}$ circle (144 degs.) between them.
- 30 Leaf of Dock—dorsi-ventral type.
- 31 Leaf of Iris—iso-bilateral type.
- 32 Leaf of Stone-Crop, centric type.
- 33 Leaf of Clover, Compound, with Palmate Leaflets.
- 34 Pinnate Leaf of Rose, Compound, with Leaflets.
- 35 Leaf and Stem of Cock's-foot Grass.
- 36 Leaf of Winter Hellebore, trans. section.
- 37 Plan of the Base of an Herbaceous Cutting (*Pelargonium*) as seen in a long section.
- 38 Mycorrhiza (fungal mycelium) on Roots of Rhododendron.
- 39 Plan of Base of a Woody Cutting (Red Currant) as seen in a long section.
- 40 Plan of two Stems, with Side Wounds in Process of Healing, as seen in cross-section.
- 41 Plan of a recently made Graft, as seen in a cross-section.
- 42 Plan of a Graft, after a year's Growth has been made, as seen in a cross-section.
- 43 Section of the Root-Graft of Clematis, Wedge-shaped piece of stem, inserted into a length of root.
- 44 Life History of a Fern.
- 45 Life History of Slime Fungus of Club Root (*Plasmopodium*).
- 46 Life History of Fungus, causing Potato Disease.
- 47 Mushroom Spores, highly magnified.
- 48 Diagram of a Flower (*Echinocea*) and its parts Essential and Non-Essential.
- 49 Fertilization of Plant Egg, and Growth of Embryo.
- 50 Seed of Vegetable Marrow, ext. view, showing Micropyle at lower left-hand corner.
- 51 Seed of Vegetable Marrow, dissected, Seed-coats removed, one side, displaying the Radicle and one Seed-leaf removed from Embryo to show Plumule and veined face of second leaf.
- 52 Seed Leaf removed from specimen shown in last figure with the Tegmen, or inner seed-coat still adhering to it.
- 53 A Seedling of White Bryony at a stage when the Seed-leaves have not freed themselves from the seed-coats.
- 54 A Seedling of White Bryony, showing the Plumule developing between the expanded seed-leaves.
- 55 Plumule, Radicle, and the one seed-leaf of the Pea Embryo.
- 56 Germinating Pea, showing elongated Radicle, and Plumule arising from between seed-leaves.
- 57 Germinating Pea at later stage, when leaves of Plumule are beginning to expand.
- 58 Fruit of Ash, dissected to show Seed and Embryo within, lying in Endosperm.
- 59 Grain (fruit) of Wheat, split so as to show Embryo lying in pouch at side of the Endosperm.
- 60 Classification of True Fruits; succulent and dry.
- 61 The parts of an Insect (Rose Chafer) *The Metamorphoses of a Moth*.
- 62 Gooseberry Moth. Eggs.
- 63 Gooseberry Moth. Caterpillar (Larva).
- 64 Gooseberry Moth. Chrysalis (Pupa).
- 65 Gooseberry Moth. Moth (Imago).
- 66 A Red "Spider"—one of the Mites.
- 67 An *Aphis*—one of the Rhynchota.
- 68 A Cabbage White Butterfly—one of the Lepidoptera.
- 69 A Cockchafer (Beetle)—one of the Coleoptera.
- 70 A Daddy Long-legs (Two-winged Fly)—one of the Diptera.
- 71 A Gooseberry Sawfly—one of the Hymenoptera.
- 72 Dry Seed of Cress, showing ridge corresponding to Radicle within.
- 73 Moistened Seed of Cress surrounded by its swollen seed-coat.
- 74 Cress Seedling showing Radicle, Root-hairs, and seed-leaves, not yet freed from seed-coat.
- 75 Cress Seedling before lobes of seed-leaves are quite expanded.
- 76 Cress Seedling, showing Plumule, with seed-leaves expanded ready to work.

NOTE.—When ordering Slides the Telegraphic Code Letters should be quoted to avoid mistakes.

A B Q**ORCHIDS AND WILD FLOWERS**

A Series of Botanical Slides from Dr. SOMERVILLE HASTINGS' Direct Negatives.
The majority of these were Photographed in their Native Surroundings.

Coloured Slides 6s. Plain Slides, 2s. 3d. each

Illustrated Notes descriptive of 60 subjects, by Dr. SOMERVILLE HASTINGS, price 1s.

- | | | |
|--|--|--|
| 1 <i>Angraceum Eichlerianum</i> , | 29 Fragrant Orchis, <i>Gymnadenia Conopsea</i> ,
x $\frac{1}{2}$. | 50 Marsh Orchis, <i>Orchis Latifolia</i> , x 3. |
| 2 Autumnal Lady's Tresses,
<i>Spiranthes Autumnalis</i> , whole plant. | 30 " " x 1. | 51 " " x 3, before and after
fertilisation. |
| 3 " x 1. | 31 " " x 3. | 52 Green-winged Meadow
Orchis, <i>Orchis Morio</i> , x 1. |
| 4 " x 4. | 32 " " x 4, before and after
pollination. | 53 " " x 1, head of flowers. |
| 5 Bee Orchis, <i>Ophrys Apifera</i> , x 1. | 33 Musk-scented Orchis, <i>Hermannum Monorchis</i> , x 4. | 54 " " x 4. |
| 6 " x 3, <i>in situ</i> . | 34 Frog Orchis, <i>Habenaria Viridis</i> , x $\frac{1}{2}$. | 55 " " x 4. |
| 7 " x 7. | 35 " " x 1. | 56 Musk Orchis, <i>Hermannum Monorchis</i> , x $\frac{1}{2}$. |
| 8 Bird's-nest Orchid, <i>Neottia Nidus-Avis</i> , x $\frac{1}{2}$. | 36 " " x 1. | 57 " " x 1. |
| 9 " x 3. | 37 Marsh Helleborine, <i>Epipactis Palustris</i> , x $\frac{1}{2}$. | 58 Pyramidal Orchis, <i>Orchis Pyramidalis</i> , x 1. |
| 10 " x 4. | 38 Purple Helleborine, <i>Cephalanthera Rubra</i> ,
x $\frac{1}{2}$. | 59 " " x 1, whole head of
flowers. |
| 11 " x 6. | 39 Large White Helleborine, <i>Cephalanthera Pallescens</i> , x $\frac{1}{2}$. | 60 " " x 4, whole head of
flowers. |
| 12 Great Butterfly Orchis,
<i>Habenaria Chlorantha</i> , x $\frac{1}{2}$. | 40 Broad-leaved Helleborine,
<i>Epipactis Latisolia</i> , x $\frac{1}{2}$. | 60a Spider Orchis, <i>Ophrys Aranifera</i> , x 1. |
| 13 " x 1. | 41 " " x $\frac{1}{2}$. | 60b " " x 4. |
| 14 Lesser Butterfly Orchis,
<i>Habenaria Bifolia</i> . | 42 " " x $\frac{1}{2}$. | 61 Spotted Orchis, <i>Orchis Maculata</i> , x $\frac{1}{2}$. |
| 15 " x 1. | 43 " " x $\frac{1}{2}$. | 62 " " x 3. |
| 16 " x 4. | 44 " " x $\frac{1}{2}$. | 63 " " Fertilisation, 1. |
| 17 " x 4, before and after
pollination. | 45 " " x $\frac{1}{2}$. | 64 " " " 2. |
| 18 Small White Butterfly
Orchis, <i>Habenaria Albida</i> , x $\frac{1}{2}$. | 46 <i>Lycopodium Fuscipata</i>
(W. Africa), x $\frac{1}{2}$. | 65 " " " 3. |
| 19 " x $\frac{1}{2}$. | 47 Lady's Slipper Orchid,
<i>Cypripedium Calceolus</i> ,
x $\frac{1}{2}$. | 66 " " " 4. |
| 20 " x 1. | 48 " " x $\frac{1}{2}$. | 67 " " " 5. |
| 21 " x 4. | 49 " " x 1. | 68 Early Purple Orchis, <i>Orchis Mascula</i> , x 1. |
| 22 <i>Dendrobium Bensonii</i> . | | 69 " " x 4. |
| 23 Dwarf Orchis, <i>Orchis Ustulata</i> , x $\frac{1}{2}$. | | 70 Common Twayblade, <i>Listera ovata</i> , x $\frac{1}{2}$. |
| 24 Dwarf Dark-winged Orchis,
<i>Orchis Ustulata</i> . | | 71 " " x 1. |
| 25 Fly Orchis, <i>Ophrys Muscifera</i> . | | 72 " " x 3. |
| 26 " x 2. | | 73 " " x $\frac{1}{2}$, whole plant. |
| 27 Fly Orchis, <i>Ophrys Muscifera</i> , x $\frac{1}{2}$, before
and after pollina-
tion. | | 74 Heart-leaved Twayblade,
<i>Listera cordata</i> , x 1. |
| 28 " x 5. | | 75 " " x 4. |
| | | 76 <i>Bulbophyllum Barbigerum</i> , x 3. |

See also page 226.

PLANTS, &c.

- | | | |
|--|--|---|
| 77 Winter Aconite, <i>Eranthis Hyemalis</i> . | 93 Bluebell, <i>Scilla Nutans</i> ,
x $\frac{1}{2}$. | 108 Cowslip, <i>Primula Veris</i> . |
| 78 " Hemp-Agrimony, <i>Eupatorium cannabinum</i> . | 94 Common Borage, <i>Borago officinalis</i> . | 109 Mountain Crane's-bill,
<i>Geranium pyrenaicum</i> . |
| 79 Alkanet, <i>Anchusa officinalis</i> . | 95 Brooklime, <i>Veronica Beccabunga</i> . | 110 Shining Crane's-bill, <i>Geranium lucidum</i> . |
| 81 Wood Anemone, <i>Anemone nemorosa</i> , x $\frac{1}{2}$. | 96 Butcher's Broom, <i>Ruscus aculeatus</i> . | 111 Crosswort or Mugwort,
<i>Gallium Cruciata</i> . |
| 82 Pasque Flower, <i>Anemone pulsatilla</i> . | 97 Unbranched Bur-reed,
<i>Sparganium Simplex</i> . | 112 Bulbous Crow's-foot, <i>Ranunculus bulbosus</i> . |
| 83 " Wild Angelica, <i>Angelica sylvestris</i> . | 98 Celery-leaved Buttercup,
<i>Ranunculus Scoleratus</i> . | 113 Water Crow's-foot, <i>Ranunculus aquatilis</i> . |
| 85 Water Avens, <i>Geum Riviale</i> . | 99 White Campion, <i>Lycoris Vespertina</i> , x $\frac{1}{2}$. | 114 " |
| 86 Common Barberry, <i>Berberis vulgaris</i> . | 100 Celandine, <i>Chelidonium majus</i> , x $\frac{1}{2}$. | 115 Daffodil, <i>Narcissus Pseudo-Narcissus</i> . |
| 87 Wood Betony, <i>Stachys Betonica</i> , x $\frac{1}{2}$. | 101 Common Centaury, <i>Erythraea Centaurium</i> . | 116 Dandelion, <i>Taraxacum Densleione</i> . |
| 88 Bilberry or Whortleberry,
<i>Vaccinium Myrtillus</i> . | 102 Chicory, <i>Cichorium Intybus</i> . | 117 Common Elder, <i>Sambucus nigra</i> , x $\frac{1}{2}$. |
| 89 Common Bird's-foot, <i>Ornithopus perpusillus</i> . | 103 Chives, <i>Allium Schoenoprasum</i> . | 118 Dwarf Elder or Danewort,
<i>Sambucus Ebulus</i> , x $\frac{1}{2}$. |
| 90 Yellow Bird's-nest, <i>Mono-</i>
<i>tropa</i> <i>Hibiscus</i> , <i>Var Hirundo</i> (Roth). | 104 Straw-rye-leaved Cinquefoil,
<i>Potentilla fragariasterum</i> . | 119 Mountain Everlasting, <i>Antennaria Diotica</i> . |
| 91 Common Bistort, <i>Polygonum bistorta</i> . | 105 Common Cotton-grass, <i>Eriophorum Polystachyon</i> . | 120 Ferns, Bracken, and Hart's-toe,
<i>Pteris</i> and <i>Scolopendrium</i> . |
| 92 Hairy Bitter-cress, <i>Cardamine hirsuta</i> . | 106 Yellow Corydalis, <i>Corydalis Lutea</i> , x $\frac{1}{2}$. | 121 Ivy-leaved Toad-flax,
<i>Linaria Cymbalaria</i> . |
| | 107 White Climbing Corydalis,
<i>Corydalis Claviculata</i> . | 122 Fleahane, <i>Fuligaria Dyseratica</i> . |
| | | 123 Furze or Gorse, <i>Ulex europeus</i> . |

WILD FLOWERS—Continued

- 124 Broad - leaved Garlick, *Allium Ursinum*
 125 Gipsy-wort, *Lycopus Europaeus*
 126 Goldilocks, *Ranunculus Auricomus*
 127 Goose-grass or Cleavers, *Gallium Aparine*.
 128 Common Guelder-rose, *Vitisburnum* *Ophiulus*
 x $\frac{1}{2}$.
 129 " x 1.
 130 " x 2, Fertile Flowers.
 131 " x 1, Cultivated.
 132 Mouse - ear Hawkweed, *Hieracium Pilosella*.
 133 Hawthorn or May, *Craetagus Oxyacanthus*.
 134 Green Hellebore, *Heleborus Viridis*.
 135 Henbane, *Hyoscyamus Niger*.
 136 Grape - hyacinth, *Muscari Racemosum*.
 137 Ground - Ivy, *Nepeta Glechoma*.
 138 Larkspur, *Delphinium Sp.*
 139 Lily of the Valley, *Convallaria Majalis*.
 140 May Lily, *Maianthemum bifolium*, x $\frac{1}{2}$.
 141 Yellow Water-lily, *Nuphar Lutea*.
 142 White Water-lily, *Nymphaea Alba*.
 143 A Liverwort, *Marchantia Palmaria*, x 1, male.
 144 " x 1, female.
 145 Lords and Ladies or Cuckoo-Pint, *Arum Maculatum*.
 146 Field Louse-wort, *Pedicularis Sylvatica*.
 147 Common Mallow, *Malva Sylvestris*.
 148 Musk Mallow (white variety), *Malva Moschata*.
 149 Nodding Bur - marigold, *Bidens Cernua*, x $\frac{1}{2}$.
 150 Marsh Marigold, *Caltha Palustris*.
 151 Black Medick, *Medicago Lupulina*.
 152 Field Melilot, *Melilotus Arvensis*, x.
 153 Perennial or Dog's Mercury, *Mercurialis Perennis*.
 154 Wild Mignonette, *Reseda Lutea*.
 155 Common Milkwort, *Polygala vulgaris*.
 156 Sea Milkwort, *Glaux Marine*.
- 157 Water Mint, *Mentha aquatica*.
 158 Monk's Hood, *Aconitum Napellus*.
 159 " x 2, Flowers in early and late stages.
 160 " x 2, Flowers in section, early and late stages.
 161 Black Mullein, *Verbascum Nigrum*.
 162 Garlick Mustard, *Sisymbrium Alliaria*.
 163 Common Hedge-Mustard, *Sisymbrium officinale*.
 164 Great Nettle, *Urtica Dioica*.
 165 Red Dead-Nettle, *Lamium Purpureum*.
 166 Common Nightshade, *Solanum Nigrum*.
 167 Wild-peaked Parsley, *Anthriscus Sylvesteris*.
 168 Earth-nut Pea, *Lathyrus Tuberosus*.
 169 Whitlow Pepper - wort, *Lipidium Draba*.
 170 Pilewort or Lesser Celadine, *Ranunculus Ficaria*.
 171 Primrose, *Primula Vulgaris*.
 172 Horse - radish, *Cochlearia Armoracia*.
 173 Yellow Rocket, *Barbarea Vulgaris*.
 174 Christmas Rose, *Heleborus Niger*.
 175 Common Dog-rose, *Rosa Canina*.
 176 Trailing Rose, *Rosa Arvensis*.
 177 Meadow Saffron, *Colchicum Autumnale*.
 178 Flowering Rush, *Butomus Umbellatus*.
 179 " x 3.
 180 Large-flowered St. John's-wort, *Hypericum Calycinum*.
 181 Sanicle, *Sanicula Europaea*, x $\frac{1}{2}$.
 182 Rue-leaved Saxifrage, *Saxifraga Tridactylites*.
 183 Sea Holly, *Eryngium Maritimum*.
 184 Sea Kale, *Crambe Maritima*.
 185 Sloe or Blackthorn, *Prunus Spinosa*.
 186 Snakes-head, *Fritillaria Meleagris*.
 187 " Snow - drop, " *Galanthus Nivalis*.

See also page 226.

AMENTIFERÆ.

- 221 The Alder, *Alnus Glutinosa*, x $\frac{1}{2}$.
 222 " x 1.
 223 The Beech, *Fagus Sylvatica*, x $\frac{1}{2}$.
 224 " x 2.
 225 The Silver Birch, *Betula Alba*, x $\frac{1}{2}$.
 226 The Hazel, *Corylus Avellana*, x $\frac{1}{2}$.
 227 " x 1.
 228 The Hornbeam, *Carpinus Betulus*, x.
 229 " x 3.
 230 The Oak, *Quercus Robur*, x $\frac{1}{2}$.
 231 " " Quercus Robur, x $\frac{1}{2}$.
 232 " x 2.
- 233 The Black Poplar, *Populus Nigra*, x $\frac{1}{2}$.
 234 " x $\frac{1}{2}$.
 235 The Willow, *Salix Sp.*, x $\frac{1}{2}$.
 236 " x 3.
 237 Dwarf Silky Willow, *Salix Repens*.

TRADE

MARK.



ORCHIDS AND WILD FLOWERS—(Continued.)

ORCHIDS.

- 238 Frog Orchid, *Habenaria viridis*
 239 Bee Orchis, *Ophrys apifera*
 240 Marsh Helleborine, *Epipactis palustris*
 241 Autumnal Lady's Tresses, *Spiranthes autumnalis*
 242 The Coral Root, *Corallorrhiza innata*

- 243 Heart-leaved Tway-blade, *Listera cordata*
 244 Man Orchis, *Aceras anthropophora*
 245 The Spotted Orchis, *Orchis maculata*
 246 Lady's Tresses, *Spiranthes autumnalis*

- 247 Bird's Nest Orchis, *Neottia nidus-avis*
 248 Man Orchis, *Aceras anthropophora*
 249 Man Orchis, *Aceras anthropophora*
 250 Lady's Slipper Orchid, *Cypripedium calceolus*

WILD FLOWERS.

- 251 Water Pepper, *Polygonum hydrophyllum*
 252 Sheep's Scallop, *Jasione montana*
 253 The Daisy, *Bellis perennis*
 254 Traveller's Joy, *Clematis vitalba*
 255 Guelder Rose, *Viburnum opulus*
 256 Greater Stitchwort, *Stellaria holostea*
 257 Woodruff, *Aegopodium odorata*
 258 The Moschatel, *Adoxa moschatellina*
 259 Arrow-grass, *Triglochin maritimum*
 260 The Autumnal Squill, *Scilla autumnalis*
 261 Spiny Rest Harrow, *Ononis spinosa*
 262 Navelwort, *Cotyledon umbilicus*
 263 The Coltsfoot, *Tussilago farfara*
 264 Marsh Gentian, *Gentiana Pterosperma*
 265 The Ciliated Heath, *Erica ciliaris*
 266 Ophione, *Obione Portulacoides*
 267 Herb Paris, *Paris quadrifolia*
 268 Agrimony, *Agrimonia Eupatoria*
 269 The Bugle, *Ajuga reptans*
 270 The Skull Cap, *Scutellaria galericulata*
 271 Dutch Clover, *Trifolium repens*
 272 Red Bartsia, *Bartsia Odontites*
 273 Masterwort, *Astrantia major*
 274 Wild Marjoram, *Origanum vulgare*
 275 Adder's Tongue, *Ophioglossum vulgatum*
 276 White Stonecrop, *Sedum album*
 277 Tasteless Mountain Stonecrop, *Sedum sexangulare*
 278 Enchanter's Nightshade, *Circaea lutetiana*
 279 Plants of a Marsh

- 280 The Hard Fern, *Blechnum spicant*
 281 Field Forget-me-not, *Myosotis arvensis*
 282 Field Pansy, *Viola tricolor*
 283 Wood Sage, *Teucrium Scordium*
 284 Shepherd's Purse, *Capsella bursa-pastoris*
 285 Great Burdock, *Arctium Lappa*
 286 Corn Marigold, *Chrysanthemum segetum*
 287 Groundsel, *Senecio vulgaris*
 288 Field Convolvulus, *Convolvulus arvensis*
 289 Cromwell, *Lilium speciosum*
 290 Marsh Forget-me-not, *Myosotis palustris*
 291 Devil's Bit Scabious, *Scabiosa caucasica*
 292 Cross-leaved Heath, *Erica tetralix*
 293 Sea Wormwood, *Artemisia maritima*
 294 Lady's Mantle, *Alchemilla vulgaris*
 295 Branched Bur-reed, *Sparganium ramosum*
 296 Male Flowers of Moss, *Polytrichum juniperinum*
 297 Wormwood, *Artemisia Absinthium*
 298 Red Foxglove, *Digitalis purpurea*
 299 Portland Spurge, *Euphorbia Portulacoides*
 300 Lungwort, *Pulmonaria officinalis*
 301 Sea Knotgrass, *Polygonum Maritimum*
 302 Fir Club Moss, *Lycopodium Selago*
 303 Creeping St. John's Wort, *Hypericum humifusum*
 304 Sea Aster, *Aster Tripolium*
 305 Cuckoo-pint (in section), *Arum maculatum*
 306 The Common Valerian, *Valeriana officinalis*

- 307 Bird's-foot Trefoil, *Lotus corniculatus*
 308 Aster (Michaelmas Daisy)
 309 Wood Anemone, *Anemone nemorosa*
 310 Snake's Head, *Fritillaria meleagris*
 311 Common Cotton Grass, *Eriophorum polystachyon*
 312 Common Tansy, *Tanacetum vulgare*
 313 Cuckoo-pint (in section, magnified), *Arum maculatum*
 314 Tuberous Bitter Vetch, *Lathyrus macrorhizus*
 315 Wayfaring Tree, *Viburnum Lantana*
 316 Wild Red Currant, *Ribes rubrum*
 317 Common Spurge Laurel, *Daphne Laureola*
 318 Sea-holly, *Suswa maritima*
 319 Lady's Smock, *Cardamine pratensis*
 320 The Oak, *Quercus robur*
 321 Mountain Bladder Fern, *Cystopteris montana*
 322 Grass of Parnassus, *Parnassia palustris*
 323 Callatriche, *Callatriche palustris*
 324 Marsh Wort, *Apium nodiflorum*
 325 Hedge Parsley, *Caucalis Antirrhinum*
 326 Columbine, *Aquilegia vulgaris*
 327 Pitcher Plant Leaves, *Nepenthes Masteriana*
 328 Coral-wort, *Dentaria bulbifera*
 329 Scaler Pimpernel, *Anagallis arvensis*
 330 The Penny-royal, *Mentha pulegium*
 331 The Great Dodder, *Cuscuta europaea*
 332 Biting Yellow Stonecrop, *Sedum acre*
 333 Chalk Milkwort, *Polygala austriaca*

For Slides of "Flowers," by Natural Colour Photography, see Science Section 2 of this Catalogue.

BWC WILD FLOWERS OF THE ENGLISH COUNTRYSIDE

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 7 Butcher's Broom.
 8 Dandelion.
 9 Cuckoo Pint.
 10 Stitchwort.

- 11 Sweet Violet.
 12 Cowslip.
 13 Lady's Smock.
 14 Early Purple Orchis.
 15 Green Winged Orchis.
 16 Water Crowfoot.
 17 Furze.
 18 Broom.
 19 The Primrose.
 20 Wood Sorrel.

- 21 Wood Spurge.
 22 Wood Violet.
 23 The Blue Bell.
 24 White Nettle.
 25 Stinging Nettle.
 26 Common Vetch.
 27 Ragged Robin.
 28 May, Hawthorn, or White-thorn.
 29 The Spotted Orchis.

WILD FLOWERS OF THE ENGLISH COUNTRYSIDE.—Continued.

30 Twayblade.	39 Large Butterfly Orchis.	47 Yellow Water Lily.
31 Wild Strawberry.	40 Meadow Sweet.	48 White Water Lily.
32 Honeysuckle.	41 Rose Bay Willow Herb or French Willow.	49 Bird's Foot Trefoil.
33 Agrimony.	42 Centaury.	50 Yellow Toadflax.
34 Foxglove.	43 Ragwort.	51 Bird's Nest Orchis.
35 Common Mallow.	44 Heather.	52 Devil's Bit Scabious.
36 Wild Rose.	45 Cross Leaved Heath.	53 Field Thistle.
37 Dog Daisy, Moon Daisy, Ox-Eye Daisy or Marguerite.	46 Harebell.	54 Sea Holly.
38 Wild Pansy.		55 Spear Plume Thistle.

B M

FLOWERS.

A Series of Direct Photographs.

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1 Arum Lily. <i>Dodymbia Spec-tabilis</i>
2 Azaleas, Wreath of, with motto "Welsh e"
3 " arranged in Vase
4 " Freesia, and White Roman Hyacinth
5 " Narcissi and Freesia
6 Cineraria
7 " arranged in Bowl
8 " arranged in Vase
9 " arranged in a tall Vase
10 Cyclamen
11 " Tulips and White Roman Hyacinth
11a Dahlias in Vase
12 Hyacinths
13 White Roman Hyacinth
14 Imnophyton Miniature
15 Lilies of the Valley
15a Lilium Auratum
16 Narcissi, Wreath of, with motto "Interval"
17 Narcissi
18 " and Azaleas
19 " Lilies of the Valley, and Trifolia
20 " and Polyanthus
21 " and Primulas
22 " Primula Tulip, and Azalea,

13 Narcissi, Primula, Tulip, and Azalea

24 Orchid

25 Primroses

26 Chinese

27 Primula

28 " Coloured

29 " arranged in Bow

30 Roses

31 Snowdrops

32 Tulips

33 " in Vase

The following are published by the kind permission of MESSRS. SUTTON AND SONS, Reading.

34 Superb Achimenes

35 Imperial Dwarf Blue Ageratum

36 St. Brigid's Anemone

37 Antirrhinum

38 Snowball Aster

39 Canterbury Bells

40 Pure White Marguerite Carnation

41 Double Salmon Clarkia Carnation

42 Convolvulus Major

43 Michelma-Daisy

44 Delphinium Hybridum

45 Brilliant Fringed Dianthus

46 Freesia

47 Gilia Diabotoma

48 Nicotiana Sylvestris

49 Pampas Grass

50 Large Flowering Pentstemon

51 Dwarf White Pearl Petunia

52 Gem Phlox Drummondii

53 Superb Double Pink

54 Double Giant Poppy

55 White Star Primula

56 Mont Blanc Star Primula

57 Large Flowered Salpiglossis

58 Statice Incana, Silver Cloud

59 Thlaspiatum Adiantifolium

60 Chamepepea Diacantha (Fish Bone Thistle)

61 Giant White Verbena

62 Double Zinnia

The following are published by the kind permission of MESSRS. CANNELL & SONS.

63 Cineraria

64 "

65 "

66 "

67 "

68 Primula

69 Primulas

70 New Cactus Dahlia

71 Daisies open (day)

72 " closed (night)

73 A Cluster of Primroses.
74 Lilies.
75 Wild Rose.
76 May.
77 Lilac.
78 Morella Cherries.
79 White Horse Chestnut.
80 Quince.
81 Plum.
82 Cherry.
83 Pear.
84 Almond.

85 Willow or Palm.

86 Mistletoe.

87 Sweet William.

By kind permission of MESSRS. SUTTON AND SONS, Reading.

88 View of the Trial Seed Grounds taken from the Air.

89 Flower Seed Stockroom.

90 Farm Seed Order Room.

91 Grass and Clover Seed Testing Laboratory.

92 Grass and Clover Seed Cleaning Machinery.

93 Interior of Laboratory at Plant Breeding and Research Station.

94 Seed Potato riddle.

95 Hand picking. Peas and Beans.

96 Cinerarias in Pavilion at Trial Grounds.

For Slides of Covent Garden Market, see Industries, Section 7, Series ABL.

A B R

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4 The Spring Anemone. <i>Anemone Vernalis</i> .
5 Pyrenean Crowfoot. <i>Ranunculus Pyrenaeus</i> .
6 Aconit - leaved Crowfoot. <i>Ranunculus Aconitifolius</i> .
7 Alpine Crowfoot. <i>Ranunculus Alpestris</i> .

8 Globe Flower. <i>Trollius Europaeus</i> .
9 Two-flowered Violet, x. <i>Viola Biflora</i> .
10 Long-spurred Pansy. <i>Viola Calcarata</i> .
11 Wood-Pink. <i>Dianthus Sylvester</i> , <i>Wulf.</i>
12 Moss Campion. <i>Silene Acaulis</i> .
13 Wood Crane's-bill. <i>Geranium Sibiricum</i> .
14 Alpine Clover. <i>Trifolium Alpinum</i> .

15 Cold Milk-Vetch, x. <i>Phaca Frigida</i> .
16 White Dryas. <i>Dryas Octopetala</i> .
17 Mountain Avens, x. <i>Geum Montanum</i> .
18 Cobweb House-leek. <i>Sempervivum Arachnoideum</i> .
19 Mountain House-leek. <i>Sempervivum Montanum</i> .
20 Purple Saxifrage. <i>Saxifraga Oppositifolia</i> .
21 White Mountain Saxifrage. <i>Saxifraga Alpina</i> .

ALPINE PLANTS—FIRST SERIES.—Continued.

- 22 Yellow Mountain Saxifrage. *Saxifraga atrolineata*.
 23 Rough Saxifrage. *Saxifraga Aspera*.
 24 Furrowed Saxifrage. *Saxifraga Exarata*. *Vill.*
 25 Large ASTRANTIA. *Astrantia Major*.
 26 Alpine Coltsfoot. *Homogyne Alpina*.
 27 Mountain Everlasting, or Cat's-foot. *Antennaria Diotica*. *Garin*.
 28 Musk Milfoil. *Achillea Moshata*. *Wulf.*
 29 Glacial Aronic. *Aronicum Glaciale*. *Rchb.*
 30 Arnica. *Arnica Montana*.
 31 Spiked Rampion. *Phyteuma Spicatum*.
 32 Scheuchzer's Bell-flower. *Campanula Scheuchzeri*. *Vill.*
 33 Red Whortleberry or Cowberry. *Vaccinium Vitis idaea*.
 34 Hairy-leaved Alpine Rose. *Rhododendrum Hirsutum*.
- 35 Rusty-leaved Alpine Rose. *Rhododendron Ferrugineum*.
 36 Yellow Gentian. *Gentiana Lutea*.
 37 Stemless Gentian. *Gentiana Acaulis*. *Grenzl.*
 38 Short-leaved Gentian, x. t. *Gentiana Brachyphylla*. *Frol.*
 39 Alpine Forget-me-not, x. t. *Myosotis Alpestris*. *Schmidt*.
 40 Alpine Toad-Flax. *Linaria Alpina*. *Mitt.*
 41 Rock Speedwell. *Veronica Saxatilis*. *Jacq.*
 42 Whorled Lousewort. *Pedicularis Verticillata*.
 43 Dull Red Lousewort. *Pedicularis Recutita*.
 44 Tuberculous Lousewort. *Pedicularis Tuberosa*.
 45 Leafy Lousewort, x. t. *Pedicularis Foliata*.
 46 Yellow Lousewort. *Pedicularis Ederi*.
 47 Alpine Bartsia. *Bartsia Alpina*.
- 48 Common Butterwort. *Pinguicula Alpina*. *Cass.*
 49 Alpine Butterwort. *Pinguicula Vulgaris*.
 50 Bird's-eye or Mealy Primrose. *Primula Farinosa*.
 51 Viscous Primrose. *Primula Viscosa*. *All.*
 52 Alpine Snowbell. *Soldanella Alpina*.
 53 Dwarf Snowbell. *Soldanella pusilla*. *Baumg.*
 54 Heart-leaved Globularia. *Globularia Cordifolia*.
 55 Reticulated Willow. *Salix Reticulata*.
 56 Small White Butterfly Orchid. *Calloglossum Albidum*. *Hartm.*
 57 Spring Crocuses. *Crocus Vernus*. *Wulf.*
 58 May Lily. *Smilacina Bifolia*. *Desf.*
 59 Alpine Lily. *Paradisia Idaeastrum*. *Bert.*
 60 White Veratrum. *Veratrum Album*.

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 65 The Common Monk's-Hood. *Aconitum Napellus*.
 66 The Hairy Rock-Cress. *Arabis hirsuta*.
 67 The Mignonette-leaved Bitter-Cress. *Cardamine resedifolia*.
 68 The Toothwort. *Dentaria digitata*.
 69 The Mountain Penny-Cress. *Thlaspi montanum*.
 70 The Common Alpine Cress. *Hutchinsia Alpina*.
 71 The Grass at Parnassus. *Parnassia palustris*.
 72 The Mountain Milkwort. *Polygala chamaebuxus*.
 73 The Creeping Gypsophila. *Gypsophila repens*.
 74 The Nottingham Catchfly. *Silene nutans*.
 75 The Sedum-like Chelidonium. *Chelidonium sedoides*.
 76 The Field Mouse-eared Chickweed. *Cerastium arvense*.
 77 The Mountain Trefoil. *Trifolium montanum*.
 78 The Brown Trefoil. *Trifolium badium*.
 79 The Alpine Rose. *Rosa Alpina*.
 80 Fleischner's Willow Herb. *Ephedrum Fleischeri*.
 81 The Perennial Knapweed. *Seleranthus perennis*.
 82 The Annual Stonecrop. *Sedum annuum*.
 83 The Thick-Leaved Stonecrop. *Sedum dasyphyllum*.
 84 The Moss-like Saxifrage. *Saxifraga bryoides*.
 85 The Wedge-leaved Saxifrage. *Saxifraga cuneifolia*.
 83 The Round-Leaved Saxifrage. *Saxifraga rotundifolia*.
 87 The Alpine Aster. *Aster Alpinus*.
 88 The Alpine Daisy. *Bellidasterum Michelii*.
 89 The Dwarf Cudweed. *Gnaphalium supinum*.
 90 The Northern Cudweed. *Gnaphalium norvegicum*.
 91 The Edelweiss. *Leontopodium Alpinus*.
- 92 The Carpathian Cudweed. *Antennaria Carpatica*.
 93 The Alpine Ox-eye. *Leucanthemum Alpinum*.
 94 The Single-flowered Groundsel. *Senecio uniflora*.
 95 The Mountain Cornflower. *Centaurea montana*.
 96 The Perennial Lettuce. *Lactuca perennis*.
 97 The Golden Hawk's Beard. *Crepis aurea*.
 98 The Hemispherical Rampion. *Phyteuma hemisphaericum*.
 99 *Phyteuma betonicaeformis*.
 100 The Bearded Bell-flower. *Campanula barbata*.
 101 The Fissured Bell-flower. *Campanula excisa*.
 102 The Dwarf Bell-flower. *Campanula pusilla*.
 103 The Mount Cenis Bell-flower. *Campanula Cenisia*.
 104 The Spiked Bell-flower. *Campanula thyrsoides*.
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 106 The Purple Gentian. *Gentiana purpurea*.
 107 The Bladder Gentian. *Gentiana utriculosa*.
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 115 The Marsh Orchis. *Orchis palustris*.
 116 The Fragrant Orchis. *Gymnadenia conopsea*.
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 118 The Lady's Slipper Orchis. *Cypripedium calceolus*.
 119 The Turk's-Cap Lily. *Lilium Martagon*.
 120 The Autumn Crocus. *Colchicum autumnale*.

B M F

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 2 Mycelia.
 3 Amanita Phalloides.
 4 Amanita ruhescens.
 5 Lepiota rachodes.
 6 Armillaria mellea.
 7 Tricholoma terreum.
 8 Mycena pura.

- 9 Mycena pura, showing specialised form of broad gill.
 10 Collybia radicans.
 11 Hydrophorus puniceus.
 12 Agaricus (Clitocybe) giganteus.
 13 Pleurotus ostreatus.
 14 Pleurotus ostreatus, Mature pilei.
 15 Cantharellus aurantiacus.

SOME BRITISH FUNGI—Continued.

- 16 *Agaricus campestris*.
 17 *Agaricus campestris*, advanced stage.
 18 *Agaricus arvensis*.
 19 *Hypholoma sublateritium*.
 20 *Hypholoma sublateritium*, showing detail.
 21 *Coprinus atramentarius*.
 22 " " detail life size.
 23 " " Mature cap decomposing
 24 " comatus.
 25 *Boletus chrysenteron*.
 26 *Bolyporus squamosus*.
 27 " " showing cap large scale.
 28 " " showing cap underside.
 29 " " showing its evolution.
 30 Specimen of imbricated *Polyporus*.
 31 *Polyporus epiphiicus*.
 32 *Fomes applanatus*.
 33 *Fomes applanatus* on blasted tree.
 34 *Polystictus velutinus*.
 35 " " showing cap.
 36 *Poria vaporaria*.
 37 " " extending down bark of living
 beech-tree.
 38 *Penicillaria rosea*.
 39 *Penicillaria querina*.
- 40 *Stereum purpureum*.
 41 *Clavaria vermicularis*.
 42 *Clavaria cristata*.
 43 *Auricularia mesenterica*.
 44 *Auricularia mesenterica*, detail.
 45 *Tremella folacea*.
 46 " " showing detail.
 47 *Tremella fimbriata*.
 48 *Lycoperdon gemmatum*.
 49 *Lycoperdon pes-caprae*.
 50 " " gemmatum and *L. echinatum*.
 51 *Mycelium* of Puff Ball, showing first stage of
 growth underground.
 52 *Ithyphallus impudicus*. The "egg" of,
 53 " The stem.
 54 " Its natural habitat.
 55 *Peziza vesiculososa*.
 56 *Peziza badia*.
 57 *Otidea aurantia*.
 58 *Xylaria Hypoxylon*. Example of Ascophore.
 59 *Xylaria polymorpha*.
 60 *Bulgaria polymorpha*.
 61 *Bulgaria polymorpha* on oak log.
 62 *Cordyceps militaris*. Ascigerous growth.
 63 *Cordyceps militaris*, extended clubs.

V Q

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 5 " " ad. (central fig.)
 6 *Tricholoma nudum*, Lilac Agaric, Ed.
 7 *Clitocybe clavipes*
 8 " *nubulosus*, Ed.
 9 *Laccaria laccata*, Amethystine Agaric
 10 *Collybia maculata*, "Cream and Nutmeg" Agaric
 11 *Pholiota squarrosa*, Shaggy Agaric
 12 " *aurea*, G. Iden Agaric
 13 *Stropharia marginata*, Verdigris Agaric, P.
 14 *Agaricus campestris*, Common Mushroom, Ed.
 15 *Hypholoma fasciculare*
 16 *L. nitida* b. *tulina*
 17 *Cortinarius sanguineus*, Blood-red Agaric
 18 *Hygrophorus praetensis*, Ed.
 19 " *virginicus*, Ed.
 20 " *coccineus*
 21 " *obruceus*
 22 *L. vittaria* *vellereum* and *subindicans* (small), Milk Mushrooms
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 24 " *alutacea*, Ed.
 25 " *drimella*, P.
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 28 " *tuberiformis*
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 30 *Panus stypticus*
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 33 " *chrysenteron*
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- 36 *Pistulina hepatica*. Beef-steak Fungus, Ed.
 37 *Polyporus besulina* juv.

- 38 " " ad.
 39 *Merulius lacrymans*, "Dry-Rot Fungus."

Ord. Hydnæ.

- 40 *Hydnellum repandum*, Ed.
 41 " *erinaceus*

Ord. Thelephoræ.

- 42 *Thelphora laciniosa*
 43 *Polystictus versicolor*
 44 *Auricularia mesenterica*
 45 *Tremellicon gelatinosum*

Ord. Clavariæ.

- 46 *Clavaria rugosa*
 47 " *cinerascens*
 48 " *pistillaris*
 49 *Calocera viscosa* and *Xylaria hypoxylon*
 50 *Sparassis crispa*

Ord. Tremellinæ.

- 51 *Tremella mesenterica*

Ord. Phalloidæ.

- 52 *Ithyphallus impudicus*, the Stinkhorn Fun-gus, P.
 53 " " successive phases.
 54 " " phases.
 55 *Mutinus caninus*, the Lesser Stinkhorn

Ord. Lycoperdaceæ.

- 56 *Lycoperdon gemmatum*, Common Puff-ball
 57 *Scleroderma verrucosum*, Scaly Puff-ball

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 68 *Calocera viscosa*
 69 *Helvelia crispa* (curled morel)
 70 *Peziza vesiculososa*
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 52 The Common Earth-ball, *Scleroderma vulgare*.
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 54 The Bird's-Nest, *Crucibulum vulgare*.
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 113 The Common Helvella, *Helvella Crispa*.
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 3 " mulberry (*Morus nigra*).
 4 " lime (*Tilia argentea* var.
 canescens).
 5 " Terrace" branch of cedar (*Cedrus libani*).
 6 Diagram of development of a sapling into typical tree forms.
 7 Example of conical form—Turkey oak (*Quercus cerris*).
 8 " domed crown—old horse-chestnut (*Aesculus hippocastanum*).
 9 " cylindroid form—young horse-chestnut.
 10 " cylindroid form—Lawson cypress (*Chamaecyparis lawsoniana*).
 11 Comparison of mode of growth of leading-shoots of wych-elm (*Ulmus glabra*) and sugar-pine (*Pinus lambertiana*).
 12 Young Austrian Pine (*Pinus laricio*).
 13 Diagram of mode of development in which position of leading-shoot is usurped by lateral-shoots.
 14 Example—young horse-chestnut.
 15 Example—old apple-tree (*Pyrus malus*).
 16 Evolution of "umbrella" form illustrated by Scots Pine (*Pinus sylvestris*).
 17 A Symmetrical tree (after Ruskin).
 18 Long-shoots and dwarf-shoots of wild cherry (*Prunus avium*).
 19 Three-years' growth of twig of lime (*Tilia europea*).
 20 Dormant buds on horse-chestnut twigs.
 21 Dormant buds on trunk of red oak (*Quercus rubra*).
 22 Coppice in winter.
 23 Three stages of growth of sweet-chestnut coppice (*Castanea sativa*).
 24 Mixed coppice in summer.
 25 Pollard willows (*Salix fragilis*).
 26 Suckers at base of common elm (*Ulmus campestris*).
- 27 Protection of lime-tree hole by shoots.
 28 Effect of proximity on tree-form.
 29 A larch-wood (*Larix europaea*).
 30 "leaning of hole" of Scots pine.
 31 Hole of Scots pine.
 32 A pine-wood.
 33 Pine-crowns from below.
 34 A wood on a windy promontory.
 35 Wind-pruned hawthorns (*Crataegus oxyacantha*).
 36 Marble-galls on oak (caused by *Cynips kollarri*).
 37 Oak-apples.
 38 Abortion of twig of lime-tree.
 39 "Witches'-brooms" on hawthorn (caused by *Eriophyes crataegi*).
 40 Weeping willow (*Salix babylonica*).
 41 Branches of weeping willow.
 42 Weeping birch (*Betula alba* var. *pendula*).
 43 Weeping box (*Buxus sempervirens* var. *pendula*).
 44 Weeping beech (*Fagus sylvatica* var. *pendula*).
 45 Lombardy poplar (*Populus nigra*).
 46 Diagram of fastigiate branching.
 47 Fastigate branches of Lombardy poplar.
 48 Fastigate branching of Lawson cypress.
 49 Fastigate yew (*taxus baccata* var. *fastigata*).
 50 Fastigate or cypress oak (*Quercus pedunculata* var. *fastigata*).
 51 Silky willow (*Salix petiolaris*) growing as shrub.
 52 The birch growing as a shrub.
 53 The elder (*Sambucus nigra*) as a tree.
 54 Diagram of old horse-chestnut branch.
 55 Characteristic branch of horse-chestnut.
 56 Terminal twigs of horse-chestnut.
 57 Horse-chestnut branches.
 58 Tortuous branches of oak.
 59 Twig of oak showing origin of tortuous branches.
 60 Crooked iliac-twigs.
 61 Tortuous branching of purple willow (*Salix purpurea*).
 62 Diagram illustrating "fountain" branching.
 63 Fountain branching of hawthorn.
 64 Fountain branching of *Phiadophlebus latifolius*.

See also a lecture on "The Herb yielding seed, and the Tree yielding fruit," page 222.

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 31 Cotton Pod, burst, showing Cotton.
 32 Cotton Bugs from life, from the Demerara Cotton Company, British Guiana.
 33 A Country Lane in Spring.
 34 The Cow Tree of the Caracas.
 35 Dragon's Blood Tree of the Island of Tenerife, Dracaena Draco.
 36 Edelweiss growing on rocks near Arolla.
 37 Elms.
 38 Elms and Oaks.
 39 Euphorbia Tree in Angola.
 40 Firus Elastica in the Peradeniya Gardens, Kandy.
 41 Gamboge Tree.
 42 Gentian (see also Rhododen-
 -on).
- 43 Grass Trees of Australia.
 44 Gutta Percha Trees, Natives collecting the Sap.
 45 Indianrubber Tree.
 46 Jack Tree, *Artocarpus integrifolia*.
 47 Sacred Lotus of the Egyptians, *Nelumbium speciosum*.
 48 Mahogany, Honduras, Tree.
 49 May Tree in Full Bloom.
 50 The Mandrake.
 51 Mangrove and Swamp.
 52 Nutmeg Tree and Fruit.
 53 Oak Tree.
 54 " in Leaf.
 55 " in Winter.
 56 Owen Glendower's Oak.
 57 Olive Tree, Gethsemane.
 58 Palm, African, Zamia Caffra.
 59 " Medicinal Aloe, Madagascar.
 60 Palm, Cocoanut.
 61 " Cocoanut, and Fruit.
 62 " Date.
 63 " Dōm Luxor.
 64 " Dwarf, Forest Scene, Madagascar.
 65 " Ivory, Nut and Fruit.
 66 " Wine-hearing Sago.
 67 " Talipat.
 68 " Talipat, 1st, Stage.

- Palm, Tarapote, *Triartea ventricosa*
 70 " Travellers'.
 71 " Wax, *Ceroxylon andicola*.
 72 Pansy (Viola).
 73 Papyrus.
 74 Prickly Pear and Cochineal Insects.
 75 Pitcher Plant.
 76 " Cluster.
 77 " and Venus's Fly-trap.
 78 The Pomegranate.
 79 Pine Tree at Arolla.
 80 A Primrose Bank.

- 81 A Group of Primroses (very fine).
 82 Rose Leaf cut by a Leaf-cutting Bee.
 83 Rhododendron ferrugineum L.; Gentiana bavarica L.; Gentiana alivalis L.; Gentiana acaulis L.
 84 The Large Flowering Sensitive Plant.
 85 Sensible Plant, Asleep and Awake.
 86 Snow on Hedge.
 87 " on Trees.

- 88 Soldanella alpina L.; Leontopodium alpinum Cass.
 89 Tangiers Tree of Madagascar.
 90 Tapioca Plant and its Root.
 91 Tea and Coffee Plants, China.
 92 Alpine Thistle.
 93 Traveller's Tree, *Urania speciosa*.
 94 Tropical Scenery, Venezuela.
 95 Upas Tree, Java.
 96 Varnish Tree.
 97 Victoria Regia, the Great Water Lily.

- 98 Fringed Violet. 2s. 9d.
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 100 Australian Tree Fern. 2s. 9d.
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 104 Beeches.
 105 Weeping Willow.
 106 Cork Trees.
 107 Para Rubber Tree.
 108 Pineapple Plant.
 109 Sycamore Tree, Jericho.
 110 Cherry Blossom. 2s. 3d.
 111 Silver Leaf Trees.

- 112 Mango Tree.
 113 Screw Pine Palm.
 114 Tall Nikes Palm.
 115 Eucalyptus Tree (Blue Gum),
 116 Variegated Bananas.
 117 Lemon Tree at Suva.
 118 Orange Ranch and Pepper Trees.
 119 Canadian Craib Apple in Blossom.
 120 Tamarind Tree.
 121 Peepul Tree.
 122 Papaya Tree.

- 123 Palmyra Palm in Blossom.
 124 Kukui or Candle Nut Trees
 125 Wild Flax and Pampas Grass
 126 Wild Fig Tree.
 127 Trained Pine Tree at Negishi, 2s. 3d.
 128 Cuckoo-pint.
 129 Mountain Ash.
 130 Sequoia or Wellingtonia (the Mammoth Tree of California).
 131 English Pine Tree.

LANTERN SLIDES SENT ON APPROVAL.

Messrs. NEWTON will be glad to send any number of Slides on approval for purchase to Customers who may find themselves unable to attend the Lantern Slide Gallery to make their own selections.

Customers will be charged with the cost of Carriage only, but be held responsible for the safety of the Slides until received back by Messrs. NEWTON.

VR THE GROWTH, STRUCTURE, DEFECTS AND CONVERSION OF TIMBER.

A Series of Lantern Slides taken from Actual Specimens of Wood, selected and prepared by Mr. HAROLD BUSBRIDGE, A.R.I.B.A., A.R.C.S., Chief Lecturer in Building Trade Subjects at the Goldsmiths' Institute, and at the L.C.C. Paddington Technical Institute.

Nos. 25 to 29 are taken from specimens in the Natural History Museum, South Kensington, by kind permission of the Curator.

Plain Slides 2s. 3d. each

A scale of inches is photographed with each specimen, so that its approximate dimensions can at once be ascertained from the picture on the screen.

In addition to the common name of each specimen, the correct botanical name of the species is placed in the photograph, so as to be easily read when thrown upon the screen.

The Growth and Structure of Stems.

- 1 Endogenous Stems, showing nodes in elevation and section
- 2 Stem of Exogen (Araucaria) showing nodes
- 3 Trunk of Exogen (Mulberry) showing burl
- 4 Cross section of Oak log showing annual rings bark, heart and sapwood, and medullary rays
- 5 Cross section of Pitch Pine showing pith and annual rings
- 6 Cross-section of Cocus-wood, showing heartwood and sap-wood
- 7 Various woods (radial sections) showing heart and sapwood
- 8 Radial sections of Elder and Chestnut, showing pith
- 9 Cross-section of Yellow Deal, showing node (five knots)

The Defects of Timber.

- 10 Two specimens showing warping due to twisted grain
- 11 Yellow Deal, showing cup-shakes
- 12 Honduras Mahogany, showing upset
- 13 Yellow Pine, showing loose knot
- 14 English Apple Tree showing druxy knot
- 15 Beech, showing druxy knot and dentiness
- 16 Beech, showing destruction caused by worms

- 17 Willow (four specimens from same tree) showing foxiness and the progress of decay
- 18 Cedar, showing rind-gall
- 19 Fir timber destroyed by dry rot (two specimens)
- 20 Fir timber covered with dry rot fungus
- 21 Fir timber destroyed by wet rot
- 22 Ash, showing heart shake
- 23 Ash, showing decayed heart, and starshake
- 24 Ash, showing ravages of dorsal parallel opidetus
- 25 Pine, showing ravages of sires juvenescus
- 26 Larch, showing ravages of wood wasps (siricidae)
- 27 Wood, showing ravages of white ants (termites)
- 28 Elm, showing ravages of "ship-worms" (torpedo)
- 29 Elm, showing starshake and inshark

The Causes of Figure in Ornamental Woods.

- 30 Four specimens showing figure produced by annual rings
- 31 Three specimens showing figure produced by medullary rays
- 32 Two specimens showing figure produced by knots or eyes
- 33 Three specimens showing figure produced by wavy grain
- 34 Three specimens showing figure produced by wavy grain

The Conversion and Shrinkage of Timber (cross sections).

- 35 English cherry seasoned in the log with bark on
- 36 English Cherry seasoned in the log with bark stripped
- 37 English Cherry seasoned in square balk
- 38 Eng. b Cherry seasoned in half-logs
- 39 English Cherry seasoned in quarters
- 40 English b Cherry seasoned in banks each side of centre
- 41 English Cherry sawn in plank cutting across the centre
- 42 English Cherry seasoned in planks cut radially

Characteristics of Various Useful Woods.

- 43 Yellow Deal showing typical grouping of knots
- 44 White Deal showing typical grouping of knots
- 45 Larch, showing typical grouping of knots
- 46 Differences in Yellow Deal caused by climate, soil, etc.
- 47 Three samples of various American Pines
- 48 Oak, Horse Chestnut and Sweet Chestnut, showing differences in grain
- 49 Cuban, Spanish and Honduras Mahogany, showing differences in grain
- 50 White and Honduras Mahogany, showing difference in colour
- 51 American Yellow Pine, showing dark hair marks
- 52 White Deal showing resin cavities

ADDITIONAL SLIDES OF "DEFECTS IN TIMBER."

- 53 Spruce Fir, showing Pith
- 54 Pinus Sylvester, showing Pith
- 55 English Oak, showing Pith, Heart Strake.
- 56 Ash with Decayed Heart.
- 57 Pear Tree. Healing of Wounds by occlusion leading to Druxy Knot.
- 58 Pear Tree. Healing of Wounds by occlusion leading to Rind Gall.
- 59 Yellow Deal, showing Rind Gall.
- 60 Spruce Fir, showing Spiral Grain.
- 61 Pinus Sylvester, showing alternating Spiral Grain.
- 62 Teredo Navalis, preserved in Alcohol.
- 63 Mahogany bored by Teredo Navalis.
- 64 The Goat Moth (Pupa, Larva, and Moth).

- 65 Poplar bored by Larvae of Goat Moth.
- 66 White Ants (Soldier, Worker, and Male).
- 67 Wood bored by White Ants.

CAUSES OF FIGURE IN WOOD.

- 68 Mahogany. Curl from Fork between Branches.
- 69 Maple. Bird's-eye caused by Plittings.
- 70 Maple. Mottling caused by small Patches of Cross Grain.
- 71 Walnut. Burr Figure caused by Irregular Grain.
- 72 Oak. Pollard Figure caused by Knots or Eyes.
- 73 Ash. Pollard Figure caused by Knots or Eyes.

For Slides on the Lumber Industry, see Industries, Section 7, and on Wood Carving, see Architecture, Section 8 of this Catalogue.

TERMS AND CONDITIONS OF HIRE OF SLIDES.

Separate slides may be selected from most of the sets in the Catalogue and hired at 3s. per dozen (minimum charge) for the first evening, and 1s. per doz. for each additional evening's use.

For the convenience of hirers it is usual to despatch slides two days before the actual date of Lecture without additional charge, and they should be returned by the first post or by passenger train the morning after use. If the slides are retained beyond this time an extra charge of 1s. per dozen for each day is incurred.

The hirer is responsible for the safety of any slides borrowed, till received back by Messrs. Newton.

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The ordinary hiring charge is at the rate of 3s. per dozen (as above), but Slides can be loaned under any of the following subscription rates:—

- £2 2s. payable in advance for Slides, at 2s. 6d. per dozen.
 - £3 3s. payable in advance for Slides, at 2s. per dozen.
 - £5 5s. payable in advance for Slides, at 1s. 6d. per dozen.
-

Messrs. Newton will be glad to quote other favourable contract rates for larger quantities of slides if desired.

Subscriptions are payable in advance, and are placed to the credit of the hirer.

In the event of any balance of subscription remaining at the end of 12 months from date of payment, Messrs. Newton are pleased to transfer such balance to another year so that the entire subscription may be reserved for the use of the hirer.

Postages, Transit risk fees, and loan or sale of Readings are charged separately.

There are certain sets in the Catalogue to which the foregoing terms do not apply; in such cases the hiring charge is clearly stated at the headings of the various sets.

Orders for slides, etc., are booked in advance, without extra charge, but as the clerical labour in the Hiring Department is a very heavy item, we are compelled to charge a fee of 1/- for every postponement of date or cancellation of order.

LANTERN SLIDES.

Owing to our specializing in the production of Lantern Slides we have attained a standard of work which is unequalled in quality, and as we make use in our London Studios of several private processes, we are able to suit the process to the subject, so that our slides are mostly far superior to the usual trade productions, being clearer, sharper in definition, more transparent and more artistic.

In the same way our painting, being done by a large staff of the finest slide artists of the day, employed exclusively on our work, and using processes invented and perfected by ourselves, is of a class unobtainable elsewhere.

Slides made from Negatives, Photographs, Prints, etc.:—

PRICES.

From Negatives by contact or reduction	2/- per slide.
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Special quotations for quantities.

Slides made in warm brown art tones at an additional cost of 6d. per slide

PHOTOGRAPHIC PRINTS.

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Quotations on application. Original Pictures Copied.

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SALE OF SLIDES.

Special discounts are allowed to Educational Institutions.

COLOURED SLIDES.

CHEAP SERIES.

If it is desired to purchase slides at a lower rate than the best coloured prices quoted at the headings of the various sets in the Catalogue, Messrs. NEWTON are able to supply them well coloured at 5/- to 6/6 each.

Customers' own slides can be painted in this cheaper series at prices varying from 3/- each.

LIGHT WOODEN VARNISHED SLIDE BOXES.

These are very strong, light, and cheap; they are made in two sizes, and the straps are fixed so as to prevent their being lost.

No. 50, to hold about 40 slides, with strap and buckle	...	...	...	£0 2 3
" 51, to hold about 60 slides, with strap and buckle	...	...	...	0 3 0

GROOVED WOODEN SLIDE BOXES.

With dovetailed corners and numbered grooves, brass hinges, and two catch fastenings, index label in lid; cleanly finished. To hold 24, 36, 50, 60 or 100 Slides. Prices on application.

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As MADE FOR THE LONDON COUNTY COUNCIL.

75. Varnished Oak or Mahogany Slide Boxes, with divisions, safety hook, felt packings, carrying strap going all round box, extra strong for travelling; 3-space for 50 slides, 13s. 6d.; 4-space for 70 slides, 15s. 6d.

NEW TRAVELLING BOX.

ATTACHE' PATTERN.

This is made similar to an attaché case, and in two sizes. Lined felt throughout; leather handle and safety hooks. In either mahogany or oak.

85 Small size, to carry 120 slides	..	..	..	..	..	..	£1 1 0
86 Large size	"	160	"	..	..	..	1 7 6

CHEAP LANTERN SLIDE TRANSIT BOXES.

105 Blackened Whitewood, to hold about 60 slides, with three cloth-covered divisions, felt top and bottom pads to guard against breakage, and strong leather strap for carrying	...	...	...	each £0 7 6
106 Ditto, to hold 100 slides	..	..	..	" 0 10 6
107 In polished mahogany, for 60 slides	" 0 10 6
108 Ditto, for 100 slides	" 0 13 6

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Patent 11835.

DESCRIPTION:—Varnished Wooden Box, with Strap-handle. An inner light wooden box contains the Slides, and rests upon straps fastened on the four inner sides of the outer box. Made in two sizes; to carry about 40 Slides, 15s. Od.; to carry about 60 Slides, 16s. 6d.

The prices include the inner box and straps.

For those who prefer to have their Slides in one of the ordinary wooden boxes, a similar varnished and padded outer case with strap can be supplied, which takes a box 12 in. by 4½ in. by 4½ in. Price, 13s. 6d.

This price does not include the inner box.

LANTERN SLIDE CABINETS.

The most convenient way of storing slides is in Cabinets containing as many drawers as are required. These are well finished in varnished whitewood; each drawer holds about 60 slides. They are also supplied in dark polished oak, the drawers being of whitewood, faced with oak.

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		In Whitewood.	In Dark Oak.
125 CABINET, comprising 4 drawers	...	£1 7 6	£1 15 0
126 CABINET, comprising 6 drawers	...	1 17 6	2 2 0
127 CABINET, comprising 9 drawers	...	2 5 0	2 10 0
128 CABINET, comprising 12 drawers	...	2 15 0	3 3 0

Full details of other boxes supplied will be sent on application.

MATERIALS FOR MAKING AND COLOURING SLIDES.

180 Transparent Notice Plates, for writing with ordinary pen (1 doz. in box)	£0 1 6
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183 Lantern Size Dry Plates	... per packet of 1 doz.
184 Cover Glasses for ditto, specially selected	... per doz.
185 Box of Lantern Masks	... 0 1 6
186 Packet of Binding Paper	... 0 1 6
187 Box of White Paper Spots, for marking slides	... 0 0 9
188 Numbers for putting on slides, 1—50..	... 0 0 9
190 Glass Painting, transparent colours and materials for painting lantern slides, tubes of moist colours, spirit, spatula, medium, brushes, palette, &c., in case	Prices on application

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